

CAREER AND TECHNICAL EDUCATION

9-12 NETWORKING 1

BOARD APPROVAL DATE: September 2020

BOARD ADOPTION OF STATE STANDARDS: September 2020

Unit Overview (Standards Coverage)

Unit	Standards	Unit Focus	Skills Overview	Suggested Pacing
Unit 1	12.9.3.IT.12 12.9.3.IT-NET.2 12.9.3.IT-SUP.5	Introduction to Networking	Basic Networking Concepts	2 weeks
Unit 2	12.9.3.IT.12 12.9.3.IT-SUP.5	Network Media – Copper Core Cable	Identify a network cable and create, test, and repair network cables	2 weeks
Unit 3	12.9.3.IT-PROG.4 12.9.3.IT-NET.5	Digital Encoding and Data Transmission	Identify data organization using the OSI model	2 weeks
Unit 4	12.9.3.IT-PROG.3 12.9.3.IT-SUP.3	Network Operating Systems and Network Communications	Common language between different network hardware and network operating systems	2 weeks
Unit 5	12.9.3.IT.6 12.9.3.IT.9 12.9.3.IT-SUP.4	Microsoft Network Operating Systems	Peer to Peer Network	4 weeks
Unit 6	12.9.3.IT.12 12.9.3.IT-SUP.7	TCP / IP Fundamentals	Configure a host to use the TCP / IP protocol	2 weeks
Unit 7	12.9.3.IT.13 12.9.3.IT-NET.3	Subnetting	Identifying IP classes by the first octet and binary to decimal	1 week
Unit 8	12.9.3.IT-SUP.1 12.9.3.IT.2	Web Servers and Services	Web server software packages and basic operation of an e-mail system	2 weeks
Unit 9	12.9.3.IT-PROG.1 12.9.3.IT-SUP.5	A Closer Look at the OSI Model	OSI model - special emphasis on the physical, data, network, and transport layers	2 weeks
Unit 10	12.9.3.IT.7 12.9.3.IT-NET.2	Maintaining the Network	Maintenance of a network system as a network administrator	1 week
Unit 11	12.9.3.IT-PROG.9 12.9.3.IT-SUP.3	Fundamentals of Troubleshooting the Network	Knowledge about various utilities, tools, of accepted methods of troubleshooting	2 weeks
Unit 12	12.9.3.IT-SUP.7 12.9.3.IT-NET.2	Designing and Installing a New Network	Concepts and knowledge needed to design network systems	2 weeks

Unit 13	12.9.3.IT.1 12.9.3.IT.9	Network+ Certification Exam Preparation	Sample Network+ Exams	2 week
Unit 14	12.9.3.IT-PROG.2 12.9.3.IT-SUP.5 CRP10	Employment in the Field of Networking Technology	Strategies IT Field Employment	2 week
Unit 15	9.3.ST.5 9.3.ST-SM.1	Robotics	Overview of Robotic Technology	1 week
Unit 16	9.3.ST-ET.1 9.3.ST-ET.4	Lego EV3 Robotic Programming	EV3 Programming	2-3 weeks
Unit 17	9.3.ST.5 9.3.ST-SM.2	3D Design	Overview of 3D Design	1 week
Unit 18	9.3.ST-ET.1	3D Design Software	Design in 3D	2-3 weeks
Unit 19	9.3.ST-ET.3 9.3.ST-SM.1	3D Printing	Overview of 3D Printers/Printing	2-3 weeks
Unit 20	9.3.ST.5 9.3.ST-ET.6	Virtual Reality	Overview of VR Technology	1 week
Unit 21	9.3.ST-ET.1 9.3.ST-ET.4	VR Design	Design/Programming in VR	2-3 weeks

This document outlines in detail the answers to following four questions:

1. What do we want our students to know?
2. How do we know if they learned it?
3. What do we do if they did not learn it?
4. What do we do when they did learn it?

Unit 1 - Introduction to Networking

CTE 9-12 / Networking 1

Content & Practice Standards (write in full)	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems. · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance strategies for computer systems. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community. 	<ul style="list-style-type: none"> · Summarize the advantages and disadvantages of a network system. · Classify a network as a LAN, MAN, or WAN. · Identify the basic network topologies. · Compare and contrast a peer to peer network with a client / server network. · Summarize how data is packaged and transmitted. · Recall the common networking protocols. · Summarize the purpose of general network devices. · Identify the major standards organizations. · Recall the layers of the OSI model. · Give examples of the function of each OSI layer.

- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.

- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.

<ul style="list-style-type: none"> · 12.9.3.IT-NET.5 Perform network administration, monitoring and support to maintain a network system. · 12.9.3.IT-SUP.1 Provide technology support to maintain service. · 12.9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs. · 12.9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems. · 12.9.3.IT-SUP.4 Perform installation, configuration and maintenance of operating systems. · 12.9.3.IT-SUP.5 Demonstrate the use of networking concepts to develop a network. · 12.9.3.IT-SUP.6 Evaluate the effectiveness of an information system. · 12.9.3.IT-SUP.7 Employ system installation and maintenance skills to setup and maintain an information system. · 12.9.3.IT-SUP.8 Employ system administration and control skills to monitor the performance of an information system. · 12.9.3.IT-SUP.9 Employ technical writing and documentation skills in support of an information system. · 12.9.3.IT-SUP.10 Apply quality assurance processes to maximize information system operation. · NJCCS 9-12.9.1.12.B.4.c,d,e,f,g Time management; Organization; Decision Making; Goal Setting; Resources Allocation · NJCCS 9-12.9.1.12.1 Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency 	<ul style="list-style-type: none"> · NJCCS 8.2.12.E.4 Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements). 	
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- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

Unit 1 - Introduction to Networking

CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY

Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.

CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)

Networking Fundamentals (2012)
Laboratory Manual Networking Fundamentals (2012)

A general overview of networking and basic networking concepts.	Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.blackbox.com www.howstuffworks.com www.microsoft.com
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UNDERSTANDINGS

<p>Students will understand that...</p> <ul style="list-style-type: none"> · How do networks provide a way to share equipment and data. · What is a LAN network. · What are the four common network topologies types.
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Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> · Students will understand that a network is an interconnected collection of computers, computer-related equipment, and communication devices. · Students will learn that networks provide a means to share software, data, equipment, and communications quickly, easily, and inexpensively. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> · Summarize the advantages and disadvantages of a network system. · Classify a network as a LAN, MAN, or WAN. · Identify the basic network topologies. · Compare and contrast a peer to peer network with a client / server network. · Summarize how data is packaged and transmitted. · Recall the common networking protocols. · Summarize the purpose of general network devices. · Identify the major standards organizations. · Recall the layers of the OSI model. · Give examples of the function of each OSI layer.

Stage 2 – Assessment Evidence

<p>Performance Tasks:</p> <p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Other Evidence (Alternate Assessments):</p> <p><i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN - Activities

- Identify the network port on the computer.
- Determine the computer's IP address.
- Change the computers IP address.
- Be aware and practice safe working skills.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 2 - Network Media – Copper Core Cable

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems. · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community. · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by 	<ul style="list-style-type: none"> • Match the five forms of electronic signals to the media types on which they travel. • Differentiate between analog and digital signals. • Summarize the two methods of data transmission: Broadband and Baseband. • Compare simplex, half-duplex, and full-duplex communication. • Recall the meaning of electronic terms resistance, impedance, reflected loss, and crosstalk. • Recall the various types of wiring faults.

strategies for computer systems.

- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network

developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.

- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and

<p>system.</p> <ul style="list-style-type: none"> · 12.9.3.IT-SUP.1 Provide technology support to maintain service. · 12.9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs. · 12.9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems. · 12.9.3.IT-SUP.4 Perform installation, configuration and maintenance of operating systems. · 12.9.3.IT-SUP.5 Demonstrate the use of networking concepts to develop a network. · 12.9.3.IT-SUP.6 Evaluate the effectiveness of an information system. · 12.9.3.IT-SUP.7 Employ system installation and maintenance skills to setup and maintain an information system. · 12.9.3.IT-SUP.8 Employ system administration and control skills to monitor the performance of an information system. · 12.9.3.IT-SUP.9 Employ technical writing and documentation skills in support of an information system. · 12.9.3.IT-SUP.10 Apply quality assurance processes to maximize information system operation. · NJCCS 9-12.9.1.12.B.4.c,d,e,f,g Time management; Organization; Decision Making; Goal Setting; Resources Allocation · NJCCS 9-12.9.1.12.1 Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency. · NJCCS 9-12.9.1.12.F.2 Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences. · NJCC.9.3.12.C Workplace Safety 	<p>conditional statements).</p>	
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<ul style="list-style-type: none"> · NJCCS 9.1.12.A Critical Thinking, Problem Solving and Decision Making · NJCCS 9.3.12.3 Follow Multi-step Procedure · NJCCS 9.3.12.3 Follow Multi-step Procedure · NJCCS 9.3.12.4 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. · CRP1. Act as a responsible and contributing citizen and employee. · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 2 - Network Media – Copper Core Cable
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students will learn to identify a network cable and create, test, and repair network cables.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.belden.com</p>

	<p>www.blackbox.com www.lanshack.com www.techfest.com</p>
UNDERSTANDINGS	
<p>Students will understand that... Students will understand that network cables are an essential part of the overall network, which must not be overlooked during network system service.</p>	
Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What type of network cable is used for most computer networks. • How many individual copper wires are in a network cable. • What does it cost per foot for a network cable. • What is the name of the connector on the end of a network cable. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Match the five forms of electronic signals to the media types on which they travel. • Differentiate between analog and digital signals. • Summarize the two methods of data transmission: Broadband and Baseband. • Compare simplex, half-duplex, and full-duplex communication. • Recall the meaning of electronic terms resistance, impedance, reflected loss, and crosstalk. • Recall the various types of wiring faults.
Stage 2 – Assessment Evidence	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
Stage 3 – Learning Plan	

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

***What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?***

PROGRESS MONITORING

***How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.***

LEARNING PLAN – Activities

- Make a Cat5e Standard Network Cable.
- Make a Cat5e Crossover Network Cable.
- Create a diagram of Standard and Crossover wiring pattern.
- Use a Network Cable Tester.
- Use network equipment tools.
- Be aware and practice safe working skills.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 3 Digital Encoding and Data Transmission

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems. · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community. · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by 	<ul style="list-style-type: none"> • Give examples of digital signals. • Identify the two modes of transmitting data between two points. • Explain data integrity inspection using a parity check. • Explain data integrity inspection using a Cyclic Redundancy Check (CRC). • Explain the complete data packaging process. • Compare connection-oriented transmission with connectionless data transmission. • Compare packet switching with circuit switching. • Identify the characteristics of the various data codes. • Interpret the structure and contents of a UDP frame. • Compare an Ethernet II frame with an IEEE 802.3 frame. • Recall the function of each layer of the OSI model.

strategies for computer systems.

- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network

developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.

- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and

<p>system.</p> <ul style="list-style-type: none"> · 12.9.3.IT-SUP.1 Provide technology support to maintain service. · 12.9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs. · 12.9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems. · 12.9.3.IT-SUP.4 Perform installation, configuration and maintenance of operating systems. · 12.9.3.IT-SUP.5 Demonstrate the use of networking concepts to develop a network. · 12.9.3.IT-SUP.6 Evaluate the effectiveness of an information system. · 12.9.3.IT-SUP.7 Employ system installation and maintenance skills to setup and maintain an information system. · 12.9.3.IT-SUP.8 Employ system administration and control skills to monitor the performance of an information system. · 12.9.3.IT-SUP.9 Employ technical writing and documentation skills in support of an information system. · 12.9.3.IT-SUP.10 Apply quality assurance processes to maximize information system operation. · NJCCS 9-12.9.1.12.B.4.c,d,e,f,g Time management; Organization; Decision Making; Goal Setting; Resources Allocation · NJCCS 9-12.9.1.12.1 Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency. · NJCCS 9-12.9.1.12.F.2 Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences. · NJCC.9.3.12.C Workplace Safety 	<p>conditional statements).</p>	
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<ul style="list-style-type: none"> · NJCCS 9.1.12.A Critical Thinking, Problem Solving and Decision Making · NJCCS 9.3.12.3 Follow Multi-step Procedure · NJCCS 9.3.12.3 Follow Multi-step Procedure · NJCCS 9.3.12.4 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. · CRP1. Act as a responsible and contributing citizen and employee. · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 3 CONTENT GRADE/COURSE CTE 9-12 / Networking 1
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Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students will learn to identify data organization using the OSI model.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.protocols.com</p>

	www.unicode.org www.wireshark.org www.osimodel.com
UNDERSTANDINGS	
<p>Students will understand that...</p> <p>Students will understand the methods of organizing data using the OSI model and how data is received and transmitted over various networks.</p>	
Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What is the OSI model. • Name the 7 layers of the OSI model. • How is data arranged into a packet of information. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Give examples of digital signals. • Identify the two modes of transmitting data between two points. • Explain data integrity inspection using a parity check. • Explain data integrity inspection using a Cyclic Redundancy Check (CRC). • Explain the complete data packaging process. • Compare connection-oriented transmission with connectionless data transmission. • Compare packet switching with circuit switching. • Identify the characteristics of the various data codes. • Interpret the structure and contents of a UDP frame. • Compare an Ethernet II frame with an IEEE 802.3 frame. • Recall the function of each layer of the OSI model.
Stage 2 – Assessment Evidence	
<p>Performance Tasks:</p> <p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Other Evidence (Alternate Assessments):</p> <p><i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>

Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Practice sending data packets over the network.
- Capture data packets (frames) with an data analyzer.
- Record the number of different OSI model layers in the frame.
- Measure the speed of data packets.
- Measure the time of data packets.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 4 Network Operating Systems and Network Communications

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for ELA Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems. · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community. · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by 	<ul style="list-style-type: none"> • Give examples of the common operating system features. • Explain Ethernet, Token Ring, Token Bus, ARCnet, and Appletalk communications. • Explain how major operating systems use the TCP / IP protocol suite along with their own proprietary protocols. • Recall the function of NetBIOS, NBNS, LLDP, LLTD, CDP, LLDP-MED, LLMNR, and ARP.

strategies for computer systems.

- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network

developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.

- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and

<p>system.</p> <ul style="list-style-type: none"> · 12.9.3.IT-SUP.1 Provide technology support to maintain service. · 12.9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs. · 12.9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems. · 12.9.3.IT-SUP.4 Perform installation, configuration and maintenance of operating systems. · 12.9.3.IT-SUP.5 Demonstrate the use of networking concepts to develop a network. · 12.9.3.IT-SUP.6 Evaluate the effectiveness of an information system. · 12.9.3.IT-SUP.7 Employ system installation and maintenance skills to setup and maintain an information system. · 12.9.3.IT-SUP.8 Employ system administration and control skills to monitor the performance of an information system. · 12.9.3.IT-SUP.9 Employ technical writing and documentation skills in support of an information system. · 12.9.3.IT-SUP.10 Apply quality assurance processes to maximize information system operation. · NJCCS 9-12.9.1.12.B.4.c,d,e,f,g Time management; Organization; Decision Making; Goal Setting; Resources Allocation · NJCCS 9-12.9.1.12.1 Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency. · NJCCS 9-12.9.1.12.F.2 Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences. · NJCC.9.3.12.C Workplace Safety 	<p>conditional statements).</p>	
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<ul style="list-style-type: none"> · NJCCS 9.1.12.A Critical Thinking, Problem Solving and Decision Making · NJCCS 9.3.12.3 Follow Multi-step Procedure · NJCCS 9.3.12.3 Follow Multi-step Procedure · NJCCS 9.3.12.4 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. · CRP1. Act as a responsible and contributing citizen and employee. · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 4 Network Operating Systems and Network Communications
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students will learn that data can be encoded in many different ways, it is the job of protocols to create a common language</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.javvin.com</p>

between different network hardware and network operating systems.	www.protocols.com www.wildpackets.com
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UNDERSTANDINGS

Students will understand that...
 Students will understand all network operating systems provide a means of communicating over the Internet by using the TCP / IP protocol. The TCP / IP protocol provides the common language for all networks to be connected world wide.

Students will know...	Students will be able to...
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What content will be covered that students must master?

- What is a network protocol.
- Give examples of a TCP / IP network.
- Why is there a need for a common language protocol.

What should students be able to accomplish to demonstrate understanding?

- Give examples of the common operating system features.
- Explain Ethernet, Token Ring, Token Bus, ARCnet, and Appletalk communications.
- Explain how major operating systems use the TCP / IP protocol suite along with their own proprietary protocols.
- Recall the function of NetBIOS, NBNS, LLDP, LLTD, CDP, LLDP-MED, LLMNR, and ARP.

Stage 2 – Assessment Evidence

Performance Tasks:
What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?

How will students demonstrate their understanding (meaning-making and transfer) through complex performance?

Laboratory Projects
 Lecture / Notes
 Current Events
 Quizzes / Tests
 Lab Reports
 Skill Presentations
 Group / Team Projects
 On-line Google Instructions / Demonstrations
 On-line Google Video Tutorials

Other Evidence (Alternate Assessments):
What other means of assessment will be used throughout this unit?

Benchmark Exam
 Homework / Classroom Assignments
 Lab Projects / Class activities
 On-line Google Activities / Forms
 Formative / Summative Assessments

Stage 3 – Learning Plan

• *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*

- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
 Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
 Does the learning plan reflect principles of learning and best practices?
 Is there tight alignment with Stages 1 and 2?
 Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
 What are potential rough spots and student misunderstandings?
 How will students get the feedback they need?
 What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

LEARNING PLAN – Activities

- Create Net Ready procedure for workstations.
- Create a peer to peer network.
- Practice sending data over the peer network.
- Use multiple older protocols for a peer network.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 5 Microsoft Network Operating Systems

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through 	<ul style="list-style-type: none"> • Differentiate between a Microsoft peer to peer network and a Microsoft client / server network. • Differentiate between FAT16, FAT32, and NTFS. • Differentiate between a domain, workgroup, and HomeGroup. • Interpret the Active Directory structure. • Use the Computer Management utility or the MMC Computer Management snap-in to set up local user and group accounts. • Use the Active Directory Users and Computers utility to set up domain user and group accounts.

- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.

social media or in an online community.

- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.

- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.

- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

Unit 5 Microsoft Network Operating Systems

CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY

CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)

<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students will be able understand and construct a Microsoft peer to peer network and a client / server network.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.microsoft.com www.technet.microsoft.com</p>
<p>UNDERSTANDINGS</p>	
<p>Students will understand that... Students will understand the difference between a peer to peer network versus a client / server network using a Microsoft operating systems.</p>	
<p>Students will know...</p>	<p>Students will be able to...</p>
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What kind of network can be made with the Microsoft operating system. • Which Microsoft network is better: Peer to Peer or client / server. • What is the cost of setting up a client / server network. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Differentiate between a Microsoft peer to peer network and a Microsoft client / server network. • Differentiate between FAT16, FAT32, and NTFS. • Differentiate between a domain, workgroup, and Home Group. • Interpret the Active Directory structure. • Use the Computer Management utility or the MMC Computer Management snap-in to set up local user and group accounts. • Use the Active Directory Users and Computers utility to set up domain user and group accounts.
<p>Stage 2 – Assessment Evidence</p>	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>

Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Create a Microsoft peer to peer network.
- Create a Microsoft client / server network.
- Create a workgroup network.
- Create a domain network.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 6 TCP / IP Fundamentals		
CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue 	<ul style="list-style-type: none"> • Explain the operation of the Network Address Translation (NAT) protocol. • Use the ipconfig command to determine the IP address and subnet mask on a workstation. • Explain the operation of the Domain Name System (DNS). • Map UDP, TCP, and IP to the OSI model. • Explain the operation of the Windows Internet Naming Service (WINS). • Explain the operation of the Dynamic Host Configuration Protocol (DHCP). • Identify Automatic Private IP Addressing (APIPA) addresses. • Differentiate between IPv4 and IPv6 transition technologies and their function. • Interpret the displays of TCP / IP troubleshooting utilities.

<p>systems.</p> <ul style="list-style-type: none"> · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance strategies for computer systems. · 12.9.3.IT-PROG.1 Analyze customer software needs and requirements. · 12.9.3.IT-PROG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications. · 12.9.3.IT-PROG.3 Analyze system and software requirements to ensure maximum operating efficiency. · 12.9.3.IT-PROG.4 Demonstrate the effective use of software development tools to develop software applications. · 12.9.3.IT-PROG.5 Apply an appropriate software development process to design a software application. · 12.9.3.IT-PROG.6 Program a computer application using the appropriate programming language. · 12.9.3.IT-PROG.7 Demonstrate software testing procedures to ensure quality products. · 12.9.3.IT-PROG.8 Perform quality assurance tasks as part of the software development cycle. · 12.9.3.IT-PROG.9 Perform software maintenance and customer support functions. · 12.9.3.IT-PROG.10 Design, create and maintain a database. · 12.9.3.IT-NET.1 Analyze customer or organizational network system needs and requirements. · 12.9.3.IT-NET.2 Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security). · 12.9.3.IT-NET.3 Design a network system using technologies, tools and standards. 	<p>in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.</p> <ul style="list-style-type: none"> · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources. · NJCCS 8.1.12.F Critical Thinking, Problem Solving and Decision Making · NJCCS 8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs. · NJCCS 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste. · NJCCS 8.2.12.A.3 Research and present information on an existing technological product that has been repurposed for a different function. · NJCCS 8.2.12.C.2 Analyze a product and how it has changed or might change over time to meet human needs and wants. · NJCCS 8.2.12.C.4 Explain and identify interdependent systems and their functions. · NJCCS 8.2.12.C.6 Research an existing product, reverse engineer and redesign it to improve form and function. · NJCCS 8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. · NJCCS 8.2.12.E.1 Demonstrate an understanding of the problem-solving capacity of computers in our world. · NJCCS 8.2.12.E.2 Analyze the relationships between internal and external 	
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- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.

computer components.

- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

Unit 6 TCP / IP Fundamentals

CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY

CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)

<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students will be able to configure a host to use the TCP / IP protocol and to troubleshoot network connection problems in a TCP / IP environment.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.technical.microsoft.com www.3com.com www.iana.org www.icann.org www.internic.org www.neoworx.com</p>
<p>UNDERSTANDINGS</p>	
<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will be able to identify the different types of IP classes by numbers. • Students will be able create a static, Manual and obtain IP system. • Students will be able create a scope of IP addresses for a server function. 	
<p>Students will know...</p>	<p>Students will be able to...</p>
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What is TCP / IP. • What are the classes of a TCP/IP protocol. • What is the difference between IPv4 and IPv6 Addressing. • How does a client receive a IP address. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Explain the operation of the Network Address Translation (NAT) protocol. • Use the ipconfig command to determine the IP address and subnet mask on a workstation. • Explain the operation of the Domain Name System (DNS). • Map UDP, TCP, and IP to the OSI model. • Explain the operation of the Windows Internet Naming Service (WINS). • Explain the operation of the Dynamic Host Configuration Protocol (DHCP). • Identify Automatic Private IP Addressing (APIPA) addresses. • Differentiate between IPv4 and IPv6 transition technologies and their function. • Interpret the displays of TCP / IP troubleshooting utilities.
<p>Stage 2 – Assessment Evidence</p>	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>

Lecture / Notes
 Current Events
 Quizzes / Tests
 Lab Reports
 Skill Presentations
 Group / Team Projects
 On-line Google Instructions / Demonstrations
 On-line Google Video Tutorials

Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?
 Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
 Does the learning plan reflect principles of learning and best practices?
 Is there tight alignment with Stages 1 and 2?
 Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?
 What are potential rough spots and student misunderstandings?
 How will students get the feedback they need?
 What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

LEARNING PLAN – Activities

- Setup a DHCP server to assign IP addresses to a client system.
- Setup a peer to peer network using IPv4 address system.
- Run ipconfig from the command prompt to reveal information about a computer.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*

• *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*

• *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 7 Subnetting CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. 	<ul style="list-style-type: none"> • Interpret binary bit patterns. • Summarize the purpose, advantages, and disadvantages of subnetting. • Carry out subnet mask calculations. • Identify subnet characteristics by inspecting a subnet mask. • Compare the bridge, switch, and router as applied to subnetting. • Summarize the characteristics and purpose of a Virtual LAN. • Compare common router protocols. • Interpret CIDR notation.

- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).

- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.

<ul style="list-style-type: none"> · 12.9.3.IT-NET.3 Design a network system using technologies, tools and standards. · 12.9.3.IT-NET.4 Perform network system installation and configuration. · 12.9.3.IT-NET.5 Perform network administration, monitoring and support to maintain a network system. · 12.9.3.IT-SUP.1 Provide technology support to maintain service. · 12.9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs. · 12.9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems. · 12.9.3.IT-SUP.4 Perform installation, configuration and maintenance of operating systems. · 12.9.3.IT-SUP.5 Demonstrate the use of networking concepts to develop a network. · 12.9.3.IT-SUP.6 Evaluate the effectiveness of an information system. · 12.9.3.IT-SUP.7 Employ system installation and maintenance skills to setup and maintain an information system. · 12.9.3.IT-SUP.8 Employ system administration and control skills to monitor the performance of an information system. · 12.9.3.IT-SUP.9 Employ technical writing and documentation skills in support of an information system. · 12.9.3.IT-SUP.10 Apply quality assurance processes to maximize information system operation. · NJCCS 9-12.9.1.12.B.4.c,d,e,f,g Time management; Organization; Decision Making; Goal Setting; Resources Allocation · NJCCS 9-12.9.1.12.1 Collaboration and teamwork enable individuals or groups 	<ul style="list-style-type: none"> · NJCCS 8.2.12.E.2 Analyze the relationships between internal and external computer components. · NJCCS 8.2.12.E.4 Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements). 	
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to achieve common goals with greater efficiency.

- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

Unit 7 Subnetting

CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>The mastery of identifying IP classes by the first octet and binary to decimal – decimal to binary conversions.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.3com.com www.boson.com/FreeUtilities.html www.cisco.com www.faqs.com www.solarwinds.net www.subnet-calculator.com www.subnetmask.info www.wildpackets.com</p>
UNDERSTANDINGS	
<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will be able to identify IP classes by the first octet. • Students will be able to convert decimal to binary. • Students will be able to convert binary to decimal. 	
Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What is a subnet. • What is the IP class of the first octet of 112. • What is a binary number. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Interpret binary bit patterns. • Summarize the purpose, advantages, and disadvantages of subnetting. • Carry out subnet mask calculations. • Identify subnet characteristics by inspecting a subnet mask. • Compare the bridge, switch, and router as applied to subnetting. • Summarize the characteristics and purpose of a Virtual LAN. • Compare common router protocols. • Interpret CIDR notation.
Stage 2 – Assessment Evidence	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>

Quizzes / Tests
 Lab Reports
 Skill Presentations
 Group / Team Projects
 On-line Google Instructions / Demonstrations
 On-line Google Video Tutorials

Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Create two subnets using the reserved IP address 192.168.0.0.
- Setup an IP address to be given to many clients.
- Learn to convert binary to decimal.
- Learn to convert decimal to binary.
- Identify IP Classes by the first octet.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*

• *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*

• *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 8 Web Servers and Services		
CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation 	<ul style="list-style-type: none"> • Beginning of Chapter • Differentiate between Internet, intranet, and extranet. • Identify the parts of a URL. • Identify the features of a Web browser. • Explain how markup languages work. • Explain how e-mail messages are transported. • Differentiate between common e-mail protocols.

technology crimes and security breaches.

- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet

in groups and/or teams that are engaged in challenging or competitive activities.

- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.

specifications (e.g., IEEE, power and security).

- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups

- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

to achieve common goals with greater efficiency.

- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

Unit 8 Web Servers and Services

CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Learn the differences between the three types of networks that provide Web page distribution. An introduction to two of the most popular Web server software packages and to the basic operation of an e-mail system.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.apache.org www.arin.net www.internic.net www.linux.org www.microsoft.com www.novell.com www.redhat.com</p>
UNDERSTANDINGS	
<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will understand the application of IIS (Internet Information Services). • Students will be able to setup a web server and ftp server. • Students will be able to setup an e-mail server system. 	
Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What is IIS. • What is FTP. • How do you setup an e-mail server. • How do web pages get to your browser. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Beginning of Chapter • Differentiate between Internet, intranet, and extranet. • Identify the parts of a URL. • Identify the features of a Web browser. • Explain how markup languages work. • Explain how e-mail messages are transported. • Differentiate between common e-mail protocols.
Stage 2 – Assessment Evidence	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>

Lab Reports
Skill Presentations
Group / Team Projects
On-line Google Instructions / Demonstrations
On-line Google Video Tutorials

Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Setup an intranet for your networking class and add IIS to function as the web server.
- Create a web page and upload to the web server via ftp protocols.
- Setup an email account to connect to the e-mail server.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*

•*Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 9 A Closer Look at the OSI Model

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue 	<ul style="list-style-type: none"> • Compare the OSI model with the DoD model. • Explain the structure and operation of the logical link control (LLC) and the media access control (MAC) sublayers. • Recall the function of each layer of the OSI model. • Match common network hardware to the layers of the OSI model. • Match common IEEE standards to the layers of the OSI model. • Explain the encapsulation process. • Match the TCP / IP protocol suite to the OSI model.

<p>systems.</p> <ul style="list-style-type: none"> · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance strategies for computer systems. · 12.9.3.IT-PROG.1 Analyze customer software needs and requirements. · 12.9.3.IT-PROG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications. · 12.9.3.IT-PROG.3 Analyze system and software requirements to ensure maximum operating efficiency. · 12.9.3.IT-PROG.4 Demonstrate the effective use of software development tools to develop software applications. · 12.9.3.IT-PROG.5 Apply an appropriate software development process to design a software application. · 12.9.3.IT-PROG.6 Program a computer application using the appropriate programming language. · 12.9.3.IT-PROG.7 Demonstrate software testing procedures to ensure quality products. · 12.9.3.IT-PROG.8 Perform quality assurance tasks as part of the software development cycle. · 12.9.3.IT-PROG.9 Perform software maintenance and customer support functions. · 12.9.3.IT-PROG.10 Design, create and maintain a database. · 12.9.3.IT-NET.1 Analyze customer or organizational network system needs and requirements. · 12.9.3.IT-NET.2 Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security). · 12.9.3.IT-NET.3 Design a network system using technologies, tools and standards. 	<p>in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.</p> <ul style="list-style-type: none"> · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources. · NJCCS 8.1.12.F Critical Thinking, Problem Solving and Decision Making · NJCCS 8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs. · NJCCS 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste. · NJCCS 8.2.12.A.3 Research and present information on an existing technological product that has been repurposed for a different function. · NJCCS 8.2.12.C.2 Analyze a product and how it has changed or might change over time to meet human needs and wants. · NJCCS 8.2.12.C.4 Explain and identify interdependent systems and their functions. · NJCCS 8.2.12.C.6 Research an existing product, reverse engineer and redesign it to improve form and function. · NJCCS 8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. · NJCCS 8.2.12.E.1 Demonstrate an understanding of the problem-solving capacity of computers in our world. · NJCCS 8.2.12.E.2 Analyze the relationships between internal and external 	
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- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.

computer components.

- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

Unit 9 A Closer Look at the OSI Model
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY

CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)

<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>A more detailed study of the OSI model is presented with special emphasis on the physical, data, network, and transport layers.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.certyourself.com www.ieff.org www.lex-com.com www.protocols.com www.split.org www.wildpackets.com</p>
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UNDERSTANDINGS

Students will understand that...
 Students will understand the OSi model as it relates to the TCP/IP protocol stack, how it compares to network equipment, and how it relates to various network operating systems.

Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What are the 7 protocols of the OSI model. • Identify the type of equipment used with each OSI layer. • How does an IP packet travel through the OSI model layers. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Compare the OSI model with the DoD model. • Explain the structure and operation of the logical link control (LLC) and the media access control (MAC) sublayers. • Recall the function of each layer of the OSI model. • Match common network hardware to the layers of the OSI model. • Match common IEEE standards to the layers of the OSI model. • Explain the encapsulation process. • Match the TCP / IP protocol suite to the OSI model.

Stage 2 – Assessment Evidence

<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Group / Team Projects
 On-line Google Instructions / Demonstrations
 On-line Google Video Tutorials

Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Observe the network traffic in the OSI model as a new network device is turned on in the network.
- Setup a program like Wireshark Network Protocol Analyzer to compare the relationships of specific protocols to the layers on the OSI model.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*

•*Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 10 Maintaining the Network		
CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue 	<ul style="list-style-type: none"> • Use a baseline to determine the performance of a network or server. • Carry out general procedures for installing patches, upgrades, and service packs. • Give examples of commonly accepted practices for protecting data. • Identify types of fault tolerance. • Distinguish between fault tolerance and disaster recovery. • Compare server data backup strategies. • Differentiate between a continuous UPS system and a standby UPS system. • Give examples of commonly accepted antivirus procedures and policies.

<p>systems.</p> <ul style="list-style-type: none"> · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance strategies for computer systems. · 12.9.3.IT-PROG.1 Analyze customer software needs and requirements. · 12.9.3.IT-PROG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications. · 12.9.3.IT-PROG.3 Analyze system and software requirements to ensure maximum operating efficiency. · 12.9.3.IT-PROG.4 Demonstrate the effective use of software development tools to develop software applications. · 12.9.3.IT-PROG.5 Apply an appropriate software development process to design a software application. · 12.9.3.IT-PROG.6 Program a computer application using the appropriate programming language. · 12.9.3.IT-PROG.7 Demonstrate software testing procedures to ensure quality products. · 12.9.3.IT-PROG.8 Perform quality assurance tasks as part of the software development cycle. · 12.9.3.IT-PROG.9 Perform software maintenance and customer support functions. · 12.9.3.IT-PROG.10 Design, create and maintain a database. · 12.9.3.IT-NET.1 Analyze customer or organizational network system needs and requirements. · 12.9.3.IT-NET.2 Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security). · 12.9.3.IT-NET.3 Design a network system using technologies, tools and standards. 	<p>in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.</p> <ul style="list-style-type: none"> · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources. · NJCCS 8.1.12.F Critical Thinking, Problem Solving and Decision Making · NJCCS 8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs. · NJCCS 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste. · NJCCS 8.2.12.A.3 Research and present information on an existing technological product that has been repurposed for a different function. · NJCCS 8.2.12.C.2 Analyze a product and how it has changed or might change over time to meet human needs and wants. · NJCCS 8.2.12.C.4 Explain and identify interdependent systems and their functions. · NJCCS 8.2.12.C.6 Research an existing product, reverse engineer and redesign it to improve form and function. · NJCCS 8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. · NJCCS 8.2.12.E.1 Demonstrate an understanding of the problem-solving capacity of computers in our world. · NJCCS 8.2.12.E.2 Analyze the relationships between internal and external 	
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- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.

computer components.

- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.
- **CRP11.** Use technology to enhance productivity.
- **CRP12.** Work productively in teams while using cultural global competence.

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Unit 10 Maintaining the Network
 CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY

CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)

<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>The maintenance of a network system is the result of constant monitoring by the network administrator, after establishing a network baseline.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.adaptec.com www.antivirus.cai.com www.apcc.com www.ca.com www.f-secure.com www.grisoft.com www.mcafee.com www.sans.org www.symantec.com www.trendmicro.com www.vcatch.com www.avast.com</p>
<p>UNDERSTANDINGS</p>	
<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will learn how to establish a network baseline. • Students will learn how to use monitoring tools to keep the network healthy. • Students will learn to maintain system software and hardware. 	
<p>Students will know...</p>	<p>Students will be able to...</p>
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What is a network baseline. • What type of monitoring tools are needed for a network. • Should a network system have a backup storage system. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Use a baseline to determine the performance of a network or server. • Carry out general procedures for installing patches, upgrades, and service packs. • Give examples of commonly accepted practices for protecting data. • Identify types of fault tolerance. • Distinguish between fault tolerance and disaster recovery. • Compare server data backup strategies. • Differentiate between a continuous UPS system and a standby UPS system. • Give examples of commonly accepted antivirus procedures and policies.
<p>Stage 2 – Assessment Evidence</p>	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms</p>

<p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	Formative / Summative Assessments
Stage 3 – Learning Plan	
<ul style="list-style-type: none"> • <i>Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)</i> • <i>Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.</i> • <i>Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.</i> • <i>Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.</i> <p>What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions? Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan? Does the learning plan reflect principles of learning and best practices? Is there tight alignment with Stages 1 and 2? Is the plan likely to be engaging and effective for all students?</p> <p>PROGRESS MONITORING <i>How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?</i> <i>What are potential rough spots and student misunderstandings?</i> <i>How will students get the feedback they need?</i> <i>What supports are needed for students to be successful? Re-teach, small group instruction, etc.</i></p> <p>LEARNING PLAN – Activities</p> <ul style="list-style-type: none"> • Setup a monitoring system on your Intranet classroom network. • Determine your network baseline. • Create a list of all hardware and software on your network. • Determine the need for a network backup system. 	

- Evaluate several Antivirus software programs.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 11 Fundamentals of Troubleshooting the Network

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that 	<ul style="list-style-type: none"> • Apply the CompTIA network troubleshooting strategy when diagnosing network problems. • Plan the best course of action to remedy a network problem. • Recall in detail the boot sequence for Windows NT-based computers. • Evaluate if a problem is user-, hardware-, or software-generated. • Give examples of the most common network problems encountered. • Use common TCP / IP utilities for troubleshooting the network.

- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.

develops over time.

- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design,

- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.

development and creation of a technological product or system.

- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving them.
- **CRP9.** Model integrity, ethical leadership and effective management.
- **CRP10.** Plan education and career paths aligned to personal goals.

<ul style="list-style-type: none"> · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 11 Fundamentals of Troubleshooting the Network
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>A review of commonly accepted methods of troubleshooting utilities, requiring not only knowledge about various utilities, tools, but also their application.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.support.microsoft.com www.technet.microsoft.com</p>

UNDERSTANDINGS

Students will understand that...

- Students will begin to develop the skills of identify common network problems.
- Students will learn to apply knowledge and skill to network problems.
- Students will maintain a log of identification of network problems and the solutions to resolve network problems.

Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What are some of the most common network problems. • What type of system recovery is needed for our classroom network. • How do you create a network system restore. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Apply the CompTIA network troubleshooting strategy when diagnosing network problems. • Plan the best course of action to remedy a network problem. • Recall in detail the boot sequence for Windows NT-based computers. • Evaluate if a problem is user-, hardware-, or software-generated. • Give examples of the most common network problems encountered. • Use common TCP / IP utilities for troubleshooting the network.

Stage 2 – Assessment Evidence

<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms</p>
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How will students demonstrate their understanding (meaning-making and transfer) through complex performance?

Laboratory Projects

Lecture / Notes

Current Events

Quizzes / Tests

Lab Reports

Skill Presentations

Group / Team Projects

On-line Google Instructions / Demonstrations

On-line Google Video Tutorials

Formative / Summative Assessments

Stage 3 – Learning Plan

• *Where is the work headed? Why is it headed there? What are the student's final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*

• *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*

• *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*

• *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

What pre-assessments will you use to check student's prior knowledge, skill levels, and potential misconceptions?

Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?

Does the learning plan reflect principles of learning and best practices?

Is there tight alignment with Stages 1 and 2?

Is the plan likely to be engaging and effective for all students?

PROGRESS MONITORING

How will you monitor students' progress toward acquisition, meaning-making, and transfer, during lesson events?

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Create a system restore for the network.
- Develop a method of recording information of problems with the network.
- Practice using the Windows Recovery Environment on the client.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 12 Designing and Installing a New Network

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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 	<ul style="list-style-type: none"> • Apply the various stages of network design to designing a network. • Design or modify a network based on specifications for networking design. • Create a naming convention for network objects. • Identify network cable connection locations using standards terminology. • Identify the various facilities used in a telecommunications infrastructure. • Summarize the use of a Multi-User Telecommunications Outlet Assembly (MUTOA) and Consolidation Points (CPs).

on IT practices.

- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.

scientific or technical context.

- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their

- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.

functions.

- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.
- **CRP8.** Utilize critical thinking to make sense of problems and persevere in solving

<p>them.</p> <ul style="list-style-type: none"> · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 12 Designing and Installing a New Network
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Introduces the concepts and knowledge needed to design network systems.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.technet.microsoft.com www.bicsi.org www.blackbox.com www.cisco.com www.hp.com www.kroneamericas.com www.siemon.com www22.verizon.com</p>

UNDERSTANDINGS

<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will develop the skills for a needs assessment and design of a new network. • Students will design the directory structure of a new network. • Students will create a naming convention for all equipment in the network. • Students will create a network map with Microsoft Visio. 	
Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What is a network map. • Why name the devices in a network. • What designs and needs are require for a network. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Apply the various stages of network design to designing a network. • Design or modify a network based on specifications for networking design. • Create a naming convention for network objects. • Identify network cable connection locations using standards terminology.

	<ul style="list-style-type: none"> • Identify the various facilities used in a telecommunications infrastructure. • Summarize the use of a Multi-User Telecommunications Outlet Assembly (MUTOA) and Consolidation Points (CPs).
Stage 2 – Assessment Evidence	
<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
Stage 3 – Learning Plan	
<ul style="list-style-type: none"> • <i>Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)</i> • <i>Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.</i> • <i>Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.</i> • <i>Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.</i> <p><i>What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?</i> <i>Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?</i> <i>Does the learning plan reflect principles of learning and best practices?</i> <i>Is there tight alignment with Stages 1 and 2?</i> <i>Is the plan likely to be engaging and effective for all students?</i></p> <p>PROGRESS MONITORING <i>How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?</i></p>	

What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Design a network map with Microsoft Visio.
- Design a network with a server, clients and printers.
- Develop a policy of use for the network.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

• *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*

• *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*

• *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 13 Network+ Certification Exam Preparation

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.RST.11-12.4. Determine the meaning of symbols, key 	<ul style="list-style-type: none"> • Evaluate your level of preparedness for the Network+ Certification exam. • Detect areas that require additional study. • Plan a strategy for additional study in areas that show a need for improvement.

- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming

- terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
 - **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
 - **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
 - **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
 - **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
 - **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
 - **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
 - **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
 - **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
 - **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.

<p>language.</p> <ul style="list-style-type: none"> · 12.9.3.IT-PROG.7 Demonstrate software testing procedures to ensure quality products. · 12.9.3.IT-PROG.8 Perform quality assurance tasks as part of the software development cycle. · 12.9.3.IT-PROG.9 Perform software maintenance and customer support functions. · 12.9.3.IT-PROG.10 Design, create and maintain a database. · 12.9.3.IT-NET.1 Analyze customer or organizational network system needs and requirements. · 12.9.3.IT-NET.2 Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security). · 12.9.3.IT-NET.3 Design a network system using technologies, tools and standards. · 12.9.3.IT-NET.4 Perform network system installation and configuration. · 12.9.3.IT-NET.5 Perform network administration, monitoring and support to maintain a network system. · 12.9.3.IT-SUP.1 Provide technology support to maintain service. · 12.9.3.IT-SUP.2 Manage operating systems and software applications, including maintenance of upgrades, patches and service packs. · 12.9.3.IT-SUP.3 Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems. · 12.9.3.IT-SUP.4 Perform installation, configuration and maintenance of operating systems. · 12.9.3.IT-SUP.5 Demonstrate the use of networking concepts to develop a network. · 12.9.3.IT-SUP.6 Evaluate the effectiveness of an information system. · 12.9.3.IT-SUP.7 Employ system installation and maintenance skills to setup and maintain an 	<ul style="list-style-type: none"> · NJCCS 8.2.12.C.4 Explain and identify interdependent systems and their functions. · NJCCS 8.2.12.C.6 Research an existing product, reverse engineer and redesign it to improve form and function. · NJCCS 8.2.12.D.3 Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system. · NJCCS 8.2.12.E.1 Demonstrate an understanding of the problem-solving capacity of computers in our world. · NJCCS 8.2.12.E.2 Analyze the relationships between internal and external computer components. · NJCCS 8.2.12.E.4 Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements). 	
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information system.

- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.
- **CRP7.** Employ valid and reliable research strategies.

<ul style="list-style-type: none"> · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
Unit 13 Network+ Certification Exam Preparation CTE 9-12 / Networking 1		
Stage 1 – Desired Results		
UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)	
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students should be able to install, configure, and troubleshoot basic network devices. Students will study and practice taking sample Network+ Exams.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.CompTIA.org www.support.microsoft.com</p>	
UNDERSTANDINGS		
<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will need to be up-to-date with A+ Certification knowledge for the Network+ Certification Exam. • Students will evaluate their preparedness for the Network+ Certification Exam. 		
Students will know...	Students will be able to...	
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • What type of questions are on the Network+ Certification Exam. • What are the 7 key strategies for passing the Network+ Certification Exam. • How many questions are on the Exam. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Evaluate your level of preparedness for the Network+ Certification exam. • Detect areas that require additional study. • Plan a strategy for additional study in areas that show a need for improvement. 	
Stage 2 – Assessment Evidence		
<p>Performance Tasks:</p>	<p>Other Evidence (Alternate Assessments):</p> <p><i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam</p>	

<p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

LEARNING PLAN – Activities

- Match the Network+ Certification exam objectives details to quality resource

material.

- Identify and practice laboratory activities that match the Network+ Certification Exam objectives.
- Take practice exams, and then identify and review problem areas.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*
- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 14 Employment in the Field of Networking Technology

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST.11-12.2. Critical Thinking, Problem Solving and Decision Making · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure 	<ul style="list-style-type: none"> • Compare networking technology careers. • Implement career information sources to plan a career in networking. • Recall networking technology educational and certification requirements. • Compare advanced training options. • Carry out a successful job search. • Construct a resume'. • Apply appropriate interview skills.

- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.
- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.

- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.

- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.

- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.
- **CRP4.** Communicate clearly and effectively and with reason.
- **CRP6.** Demonstrate creativity and innovation.

<ul style="list-style-type: none"> · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 14 Employment in the Field of Networking Technology

CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<p><i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i></p> <p>Students will learn that networking technology and related computer careers require a basic & advanced education in computers and networking. It is essential to plan strategies for gaining training, certifications and keeping up-to-date with technology changes for employment in the IT field.</p>	<p>Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools. www.giac.org www.isc2.org www.lpi.org www.mcmcse.com www.novell.com</p>

UNDERSTANDINGS

<p>Students will understand that...</p> <ul style="list-style-type: none"> • Students will understand that careers in the IT field require continuous education and certification. • Students must continually update knowledge and skills to remain current with technology changes in IT fields. 	
Students will know...	Students will be able to...
<p><i>What content will be covered that students must master?</i></p> <ul style="list-style-type: none"> • Name the types of career jobs available in the field of IT. • What type of training and or certifications are required for employment in the IT field. 	<p><i>What should students be able to accomplish to demonstrate understanding?</i></p> <ul style="list-style-type: none"> • Compare networking technology careers. • Implement career information sources to plan a career in networking. • Recall networking technology educational and certification requirements. • Compare advanced training options.

<ul style="list-style-type: none"> • How often does a person need to retrain and or certify in the IT field. 	<ul style="list-style-type: none"> • Carry out a successful job search. • Construct a resume’. • Apply appropriate interview skills.
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Stage 2 – Assessment Evidence

<p>Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i></p> <p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

<ul style="list-style-type: none"> • <i>Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)</i> • <i>Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.</i> • <i>Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.</i> • <i>Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.</i> <p><i>What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions? Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan? Does the learning plan reflect principles of learning and best practices? Is there tight alignment with Stages 1 and 2? Is the plan likely to be engaging and effective for all students?</i></p> <p>PROGRESS MONITORING <i>How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?</i></p>
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What are potential rough spots and student misunderstandings?

How will students get the feedback they need?

What supports are needed for students to be successful? Re-teach, small group instruction, etc.

LEARNING PLAN – Activities

- Research a possible certification you wish to obtain and the amount of time required to prepare for the certification.
- Identify the types of jobs available with certification's.
- Prepare resume'.
- Use the Internet to locate three different job descriptions for the following jobs.
 - Web Master
 - Network Administrator
 - Network support specialist
 - Help desk technician.

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

• *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*

• *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*

• *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

<p>Tier III: Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.</p>
<p>ELL: Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.</p>
<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 15 – Robotics CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. · 12.9.3.IT.3 Demonstrate the use of cross-functional teams in achieving IT project goals. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. · CCCS.ELA-LITERACY.WHST 11-12.2. Critical Thinking, Problem Solving and Decision Making 	<ul style="list-style-type: none"> •

<ul style="list-style-type: none"> · 12.9.3.IT.4 Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors. · 12.9.3.IT.5 Explain the implications of IT on business development. · 12.9.3.IT.6 Describe trends in emerging and evolving computer technologies and their influence on IT practices. · 12.9.3.IT.7 Perform standard computer backup and restore procedures to protect IT information. · 12.9.3.IT.8 Recognize and analyze potential IT security threats to develop and maintain security requirements. · 12.9.3.IT.9 Describe quality assurance practices and methods employed in producing and providing quality IT products and services. · 12.9.3.IT.10 Describe the use of computer forensics to prevent and solve information technology crimes and security breaches. · 12.9.3.IT.12 Demonstrate knowledge of the hardware components associated with information systems. · 12.9.3.IT.13 Compare key functions and applications of software and determine maintenance strategies for computer systems. · 12.9.3.IT-PROG.1 Analyze customer software needs and requirements. · 12.9.3.IT-PROG.2 Demonstrate the use of industry standard strategies and project planning to meet customer specifications. · 12.9.3.IT-PROG.3 Analyze system and software requirements to ensure maximum operating efficiency. · 12.9.3.IT-PROG.4 Demonstrate the effective use of software development tools to develop software applications. 	<ul style="list-style-type: none"> · CCCS.ELA-LITERACY.RST.11-12.4 Workplace Safety · CCCS.ELA-LITERACY.RST.11-12.4. Follow Multi-step Procedure · CCCS.ELA-LITERACY.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. · LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e Provide a concluding statement or section that follows from and supports the information or explanation provided. · WORK.9-12.9.1.12.1 The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time. · WORK.9-12.9.1.12.2 Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities. · NJCCS 8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community. · NJCCS 8.1.12.E.1 Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources. · NJCCS 8.1.12.F Critical Thinking, Problem Solving and Decision Making · NJCCS 8.1.12.F.1 Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs. · NJCCS 8.2.12.A.2 Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste. 	
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- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.
- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.

- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.
- **CRP2.** Apply appropriate academic and technical skills.

<ul style="list-style-type: none"> · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 15 – Robotics
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i>	Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools.

UNDERSTANDINGS

Students will understand that...

Students will know...	Students will be able to...
<i>What content will be covered that students must master?</i>	<i>What should students be able to accomplish to demonstrate understanding?</i>

Stage 2 – Assessment Evidence

Performance Tasks: <i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i>	Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i> Benchmark Exam Homework / Classroom Assignments
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<p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
 - *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
 - *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
 - *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*
- What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

- How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?*
- What are potential rough spots and student misunderstandings?*
- How will students get the feedback they need?*
- What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students

- *Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.*

- *Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.*
- *Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.*

Gifted & Talented:

Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.

Tier I:

Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.

Tier II:

Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.

Tier III:

Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.

ELL:

Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.

504s:

Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

SPED:

Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.

Unit 16 - Lego EV3 Robotic Programming

CTE 9-12 / Networking 1

Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality information technology (IT) product or service. 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas. 	<ul style="list-style-type: none"> •

- **12.9.3.IT.3** Demonstrate the use of cross-functional teams in achieving IT project goals.
- **12.9.3.IT.4** Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.

- **CCCS.ELA-LITERACY.WHST 11-12.2.** Critical Thinking, Problem Solving and Decision Making
- **CCCS.ELA-LITERACY.RST.11-12.4** Workplace Safety
- **CCCS.ELA-LITERACY.RST.11-12.4.** Follow Multi-step Procedure
- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.
- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to

- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

identify the trade-offs in terms of availability, cost, desirability and waste.

- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.

<ul style="list-style-type: none"> · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 16 - Lego EV3 Robotic Programming
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i>	Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools.

UNDERSTANDINGS

Students will understand that...	
Students will know...	Students will be able to...
<i>What content will be covered that students must master?</i>	<i>What should students be able to accomplish to demonstrate understanding?</i>

Stage 2 – Assessment Evidence

Performance Tasks:	Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i>
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<p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students
<ul style="list-style-type: none"> • <i>Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.</i> • <i>Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.</i> • <i>Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.</i>
<p>Gifted & Talented: Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.</p>
<p>Tier I: Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.</p>
<p>Tier II: Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.</p>
<p>Tier III: Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.</p>
<p>ELL: Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.</p>
<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 17 - 3D Design CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units 	<ul style="list-style-type: none"> •

information technology (IT) product or service.

- **12.9.3.IT.3** Demonstrate the use of cross-functional teams in achieving IT project goals.
- **12.9.3.IT.4** Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.

consistently in formulas.

- **CCCS.ELA-LITERACY.WHST 11-12.2.** Critical Thinking, Problem Solving and Decision Making
- **CCCS.ELA-LITERACY.RST.11-12.4** Workplace Safety
- **CCCS.ELA-LITERACY.RST.11-12.4.** Follow Multi-step Procedure
- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.

<ul style="list-style-type: none"> · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 17 - 3D Design
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i>	Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools.

UNDERSTANDINGS

Students will understand that...	
Students will know...	Students will be able to...
<i>What content will be covered that students must master?</i>	<i>What should students be able to accomplish to demonstrate understanding?</i>

Stage 2 – Assessment Evidence

Performance Tasks:	Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i> Benchmark Exam
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<p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students
<ul style="list-style-type: none"> • <i>Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.</i> • <i>Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.</i> • <i>Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.</i>
<p>Gifted & Talented: Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.</p>
<p>Tier I: Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.</p>
<p>Tier II: Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.</p>
<p>Tier III: Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.</p>
<p>ELL: Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.</p>
<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 18 - 3D Design Software CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units 	<ul style="list-style-type: none"> •

information technology (IT) product or service.

- **12.9.3.IT.3** Demonstrate the use of cross-functional teams in achieving IT project goals.
- **12.9.3.IT.4** Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.

consistently in formulas.

- **CCCS.ELA-LITERACY.WHST 11-12.2.** Critical Thinking, Problem Solving and Decision Making
- **CCCS.ELA-LITERACY.RST.11-12.4** Workplace Safety
- **CCCS.ELA-LITERACY.RST.11-12.4.** Follow Multi-step Procedure
- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.

<ul style="list-style-type: none"> · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 18 - 3D Design Software
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i>	Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools.

UNDERSTANDINGS

Students will understand that...	
Students will know...	Students will be able to...
<i>What content will be covered that students must master?</i>	<i>What should students be able to accomplish to demonstrate understanding?</i>

Stage 2 – Assessment Evidence

Performance Tasks:	Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i>
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<p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students
<ul style="list-style-type: none"> • <i>Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.</i> • <i>Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.</i> • <i>Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.</i>
<p>Gifted & Talented: Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.</p>
<p>Tier I: Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.</p>
<p>Tier II: Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.</p>
<p>Tier III: Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.</p>
<p>ELL: Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.</p>
<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 19 - 3D Printing CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units 	<ul style="list-style-type: none"> •

information technology (IT) product or service.

- **12.9.3.IT.3** Demonstrate the use of cross-functional teams in achieving IT project goals.
- **12.9.3.IT.4** Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.

consistently in formulas.

- **CCCS.ELA-LITERACY.WHST 11-12.2.** Critical Thinking, Problem Solving and Decision Making
- **CCCS.ELA-LITERACY.RST.11-12.4** Workplace Safety
- **CCCS.ELA-LITERACY.RST.11-12.4.** Follow Multi-step Procedure
- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.

<ul style="list-style-type: none"> · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 19 - 3D Printing
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i>	Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools.

UNDERSTANDINGS

Students will understand that...	
Students will know...	Students will be able to...
<i>What content will be covered that students must master?</i>	<i>What should students be able to accomplish to demonstrate understanding?</i>

Stage 2 – Assessment Evidence

Performance Tasks:	Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i>
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<p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students
<ul style="list-style-type: none"> • <i>Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.</i> • <i>Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.</i> • <i>Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.</i>
<p>Gifted & Talented: Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.</p>
<p>Tier I: Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.</p>
<p>Tier II: Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.</p>
<p>Tier III: Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.</p>
<p>ELL: Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.</p>
<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 20 - Virtual Reality CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units 	<ul style="list-style-type: none"> •

information technology (IT) product or service.

- **12.9.3.IT.3** Demonstrate the use of cross-functional teams in achieving IT project goals.
- **12.9.3.IT.4** Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.

consistently in formulas.

- **CCCS.ELA-LITERACY.WHST 11-12.2.** Critical Thinking, Problem Solving and Decision Making
- **CCCS.ELA-LITERACY.RST.11-12.4** Workplace Safety
- **CCCS.ELA-LITERACY.RST.11-12.4.** Follow Multi-step Procedure
- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
- **NJCCS 9.1.12.A** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.3** Follow Multi-step Procedure
- **NJCCS 9.3.12.4** 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.
- **CRP1.** Act as a responsible and contributing citizen and employee.

<ul style="list-style-type: none"> · CRP2. Apply appropriate academic and technical skills. · CRP4. Communicate clearly and effectively and with reason. · CRP6. Demonstrate creativity and innovation. · CRP7. Employ valid and reliable research strategies. · CRP8. Utilize critical thinking to make sense of problems and persevere in solving them. · CRP9. Model integrity, ethical leadership and effective management. · CRP10. Plan education and career paths aligned to personal goals. · CRP11. Use technology to enhance productivity. · CRP12. Work productively in teams while using cultural global competence. 		
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Unit 20 - Virtual Reality
CTE 9-12 / Networking 1

Stage 1 – Desired Results

UNIT SUMMARY	CORE AND SUPPLEMENTAL MATERIALS/RESOURCES (OPEN RESOURCES)
<i>Brief 2-4 sentence description of unit purpose, what is covered, and what students will understand at the conclusion of the unit.</i>	Networking Fundamentals (2012) Laboratory Manual Networking Fundamentals (2012) Study Guide Networking Fundamentals (2012) Classroom Computers, Related Equipment, Software, and Tools.

UNDERSTANDINGS

Students will understand that...	
Students will know...	Students will be able to...
<i>What content will be covered that students must master?</i>	<i>What should students be able to accomplish to demonstrate understanding?</i>

Stage 2 – Assessment Evidence

Performance Tasks:	Other Evidence (Alternate Assessments): <i>What other means of assessment will be used throughout this unit?</i>
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<p><i>What projects, hands-on lessons, use of manipulatives, active participation in new situations, etc. will reveal evidence of meaning-making and transfer (true understanding)?</i></p> <p><i>How will students demonstrate their understanding (meaning-making and transfer) through complex performance?</i></p> <p>Laboratory Projects Lecture / Notes Current Events Quizzes / Tests Lab Reports Skill Presentations Group / Team Projects On-line Google Instructions / Demonstrations On-line Google Video Tutorials</p>	<p>Benchmark Exam Homework / Classroom Assignments Lab Projects / Class activities On-line Google Activities / Forms Formative / Summative Assessments</p>
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Stage 3 – Learning Plan

- *Where is the work headed? Why is it headed there? What are the student’s final performance obligations, the anchoring performance assessments? What are the criteria by which student work will be judged for understanding? (These are questions asked by students. Help the student see the answers to these questions upfront.)*
- *Hook the student through engaging and provocative entry points: thought-provoking and focusing experiences, issues, oddities, problems, and challenges that point toward essential questions, core ideas, and final performance tasks.*
- *Explore and Equip. 21st Century Learning and Interdisciplinary connections. Engage students in learning experiences that allow them to explore the big ideas and essential questions; that cause them to pursue leads or hunches, research and test ideas, try things out. Equip students for the final performances through guided instruction and coaching on needed skill and knowledge. Have them experience the ideas to make them real.*
- *Organize and sequence the learning for maximal engagement and effectiveness, given the desired results.*

*What pre-assessments will you use to check student’s prior knowledge, skill levels, and potential misconceptions?
Are all three types of goals (acquisition, meaning, and transfer) addressed in the learning plan?
Does the learning plan reflect principles of learning and best practices?
Is there tight alignment with Stages 1 and 2?
Is the plan likely to be engaging and effective for all students?*

PROGRESS MONITORING

*How will you monitor students’ progress toward acquisition, meaning-making, and transfer, during lesson events?
What are potential rough spots and student misunderstandings?
How will students get the feedback they need?
What supports are needed for students to be successful? Re-teach, small group instruction, etc.*

Planned Differentiation & Interventions for Tiers I, II, III, ELL, 504s, SPED, and Gift & Talented Students
<ul style="list-style-type: none"> • <i>Rethink and revise. Dig deeper into ideas at issue (through the faces of understanding). Revise, rehearse, and refine, as needed. Guide students in self-assessment and self-adjustment, based on feedback from inquiry, results, and discussion.</i> • <i>Evaluate understandings. Reveal what has been understood through final performances and products. Involve students in a final self-assessment to identify remaining questions, set future goals, and point toward new units and lessons.</i> • <i>Tailor (personalize) the work to ensure maximum interest and achievement. Differentiate the approaches used and provide sufficient options and variety (without compromising goals) to make it most likely that all students will be engaged and effective.</i>
<p>Gifted & Talented: Designed for students that can go beyond the scope of the lesson, may develop an individual project(s) to further enhance their individual skill. These projects could include computer software/hardware trouble shooting, advanced systems preparations for new project lessons. GT students are tiered leaders and can be paired with students in tiers 2 and 3.</p>
<p>Tier I: Provide students with opportunity to research/develop the lesson, and enhance their overall skill of the lesson. These on line sources could include video instruction of the specific project lesson.</p>
<p>Tier II: Students that may need lesson reinforcement may be paired with tiered leaders that have demonstrated lesson mastery, and or provide students with alternate methods of learning via online data pertaining to the lesson. In some cases, a more detailed guided instruction may be needed to be given to the student.</p>
<p>Tier III: Provide students with additional time, one on one instruction, paired with tiered leaders, and or alternate methods/completion of project learning, classroom assignments and exams.</p>
<p>ELL: Students have access to Google translate. Students may have assignments and assessments printed in their native language if available. Students will be partnered with other students that speak their language if possible. Students may take quiz/exams with ELL teacher.</p>
<p>504s: Accommodating based on recommendations. Ability for notes and lessons to be unplugged, select grouping. Etc... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>
<p>SPED: Accommodations will be provided according to IEP. Examples: preferential seating, extra time to complete assignments and quiz, read quiz aloud, copy of notes... Additionally, SPED students will be grouped into appropriate tiers and receive those additional accommodations.</p>

Unit 21 - VR Design CTE 9-12 / Networking 1		
Content & Practice Standards	Suggested Standards for Practice	Critical Knowledge & Skills
<ul style="list-style-type: none"> · 12.9.3.IT.1 Demonstrate effective professional communication skills and practices that enable positive customer relationships. · 12.9.3.IT.2 Use product or service design processes and guidelines to produce a quality 	<ul style="list-style-type: none"> · CCCS.MATH.CONTENT.HSN-Q.A.1-3 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units 	<ul style="list-style-type: none"> •

information technology (IT) product or service.

- **12.9.3.IT.3** Demonstrate the use of cross-functional teams in achieving IT project goals.
- **12.9.3.IT.4** Demonstrate positive cyber citizenry by applying industry accepted ethical practices and behaviors.
- **12.9.3.IT.5** Explain the implications of IT on business development.
- **12.9.3.IT.6** Describe trends in emerging and evolving computer technologies and their influence on IT practices.
- **12.9.3.IT.7** Perform standard computer backup and restore procedures to protect IT information.
- **12.9.3.IT.8** Recognize and analyze potential IT security threats to develop and maintain security requirements.
- **12.9.3.IT.9** Describe quality assurance practices and methods employed in producing and providing quality IT products and services.
- **12.9.3.IT.10** Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.
- **12.9.3.IT.12** Demonstrate knowledge of the hardware components associated with information systems.
- **12.9.3.IT.13** Compare key functions and applications of software and determine maintenance strategies for computer systems.
- **12.9.3.IT-PROG.1** Analyze customer software needs and requirements.
- **12.9.3.IT-PROG.2** Demonstrate the use of industry standard strategies and project planning to meet customer specifications.
- **12.9.3.IT-PROG.3** Analyze system and software requirements to ensure maximum operating efficiency.

consistently in formulas.

- **CCCS.ELA-LITERACY.WHST 11-12.2.** Critical Thinking, Problem Solving and Decision Making
- **CCCS.ELA-LITERACY.RST.11-12.4** Workplace Safety
- **CCCS.ELA-LITERACY.RST.11-12.4.** Follow Multi-step Procedure
- **CCCS.ELA-LITERACY.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.
- **LA.11-12.CCSS.ELA-Literacy.WHST.11-12.2e** Provide a concluding statement or section that follows from and supports the information or explanation provided.
- **WORK.9-12.9.1.12.1** The ability to recognize a problem and apply critical thinking and problem-solving skills to solve the problem is a lifelong skill that develops over time.
- **WORK.9-12.9.1.12.2** Leadership abilities develop over time through participation in groups and/or teams that are engaged in challenging or competitive activities.
- **NJCCS 8.1.12.C.1** Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
- **NJCCS 8.1.12.E.1** Produce a position statement about a real world problem by developing a systematic plan of investigation with peers and experts synthesizing information from multiple sources.
- **NJCCS 8.1.12.F** Critical Thinking, Problem Solving and Decision Making
- **NJCCS 8.1.12.F.1** Evaluate the strengths and limitations of emerging technologies and their impact on educational, career, personal and or social needs.

- **12.9.3.IT-PROG.4** Demonstrate the effective use of software development tools to develop software applications.
- **12.9.3.IT-PROG.5** Apply an appropriate software development process to design a software application.
- **12.9.3.IT-PROG.6** Program a computer application using the appropriate programming language.
- **12.9.3.IT-PROG.7** Demonstrate software testing procedures to ensure quality products.
- **12.9.3.IT-PROG.8** Perform quality assurance tasks as part of the software development cycle.
- **12.9.3.IT-PROG.9** Perform software maintenance and customer support functions.
- **12.9.3.IT-PROG.10** Design, create and maintain a database.
- **12.9.3.IT-NET.1** Analyze customer or organizational network system needs and requirements.
- **12.9.3.IT-NET.2** Analyze wired and wireless network systems to determine if they meet specifications (e.g., IEEE, power and security).
- **12.9.3.IT-NET.3** Design a network system using technologies, tools and standards.
- **12.9.3.IT-NET.4** Perform network system installation and configuration.
- **12.9.3.IT-NET.5** Perform network administration, monitoring and support to maintain a network system.
- **12.9.3.IT-SUP.1** Provide technology support to maintain service.
- **12.9.3.IT-SUP.2** Manage operating systems and software applications, including maintenance of upgrades, patches and service packs.
- **12.9.3.IT-SUP.3** Apply appropriate troubleshooting techniques in resolving computer hardware, software and configuration problems.

- **NJCCS 8.2.12.A.2** Analyze a current technology and the resources used, to identify the trade-offs in terms of availability, cost, desirability and waste.
- **NJCCS 8.2.12.A.3** Research and present information on an existing technological product that has been repurposed for a different function.
- **NJCCS 8.2.12.C.2** Analyze a product and how it has changed or might change over time to meet human needs and wants.
- **NJCCS 8.2.12.C.4** Explain and identify interdependent systems and their functions.
- **NJCCS 8.2.12.C.6** Research an existing product, reverse engineer and redesign it to improve form and function.
- **NJCCS 8.2.12.D.3** Determine and use the appropriate resources (e.g., CNC (Computer Numerical Control) equipment, 3D printers, CAD software) in the design, development and creation of a technological product or system.
- **NJCCS 8.2.12.E.1** Demonstrate an understanding of the problem-solving capacity of computers in our world.
- **NJCCS 8.2.12.E.2** Analyze the relationships between internal and external computer components.
- **NJCCS 8.2.12.E.4** Use appropriate terms in conversation (e.g., troubleshooting, peripherals, diagnostic software, GUI, abstraction, variables, data types and conditional statements).

- **12.9.3.IT-SUP.4** Perform installation, configuration and maintenance of operating systems.
- **12.9.3.IT-SUP.5** Demonstrate the use of networking concepts to develop a network.
- **12.9.3.IT-SUP.6** Evaluate the effectiveness of an information system.
- **12.9.3.IT-SUP.7** Employ system installation and maintenance skills to setup and maintain an information system.
- **12.9.3.IT-SUP.8** Employ system administration and control skills to monitor the performance of an information system.
- **12.9.3.IT-SUP.9** Employ technical writing and documentation skills in support of an information system.
- **12.9.3.IT-SUP.10** Apply quality assurance processes to maximize information system operation.
- **NJCCS 9-12.9.1.12.B.4.c,d,e,f,g** Time management; Organization; Decision Making; Goal Setting; Resources Allocation
- **NJCCS 9-12.9.1.12.1** Collaboration and teamwork enable individuals or groups to achieve common goals with greater efficiency.
- **NJCCS 9-12.9.1.12.F.2** Demonstrate a positive work ethic in various settings, including the classroom and during structured learning experiences.
- **NJCC.9.3.12.C** Workplace Safety
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Unit 21 - VR Design
CTE 9-12 / Networking 1

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