

CURRICULUM MAPPING TEMPLATE

Program: Computer Systems Networking and Telecommunications 11.0901

Segment	CTE Segments/Performance Elements	CTE Concepts	Math Concepts	Common Core Math Standards Middle School	Common Core Math Standards High School
1	PC Hardware				
	IV. INFORMATION TECHNOLOGY APPLICATIONS B. Employ technological tools to expedite workflow. 25. Operate computer driven equipment and machines.	Use Word PPT E-mail Cloud			
	IX. EMPLOYABILITY AND CAREER DEVELOPMENT B. Explore, plan, and effectively manage careers. 5. Examine licensing, certification and credentialing requirements at the national, state and local levels to maintain compliance with industry requirements.	Careers, certifications open doors	Compare cost of education and certifications versus lifetime gains (2)	6.NS.2; 6.NS.3; 7.NS.1; 7.EE.3	A.APR.1; A.APR.7; N.RN.3; N.Q.1
	X. TECHNICAL SKILLS C. Demonstrate knowledge of the hardware components associated with information systems. 3. Identify computer classifications and hardware. 4. Describe elements and types of information processing. 6. Describe the function of CPUs. N. Maintain computer systems to ensure optimal IT system functioning. 4. Configure systems to provide optimal system interfaces.	System components (storage, processors, RAM, memory, PSU, mother board, peripherals, video, GPU), compare CPU speed, voltage, wattage, overclocking	Exponents (1) Whole numbers (+-x/) (1) Algebraic equations (1) (wattage) Rates of change (1) (speeds, overclocking) Word problems (2)	6.NS.2; 6.NS.3; 7.NS.1; 7.EE.3; 6.EE.2; 6.RP.3; 7.RP.1	A.APR.1; A.APR.7; N.RN.3; N.Q.1; A.CED.4; N.Q.2; N.Q.3; S.ID.6; F.IF.4; F.IF.6; S.ID.7

Segment	CTE Segments/Performance Elements	CTE Concepts	Math Concepts	Common Core Math Standards Middle School	Common Core Math Standards High School
2	COMPONENT DESIGN PROCESS/PROBLEM SOLVING				
	<p>I. ACADEMIC FOUNDATIONS C. Demonstrate science knowledge and skills required to pursue the full range of post-secondary and career education opportunities. 1. Evaluate scientific constructs including conclusions, conflicting data, controls, data, inferences, limitations, questions, sources of errors, and variables. 2. Apply scientific methods in qualitative and quantitative analysis, data gathering, direct and indirect observation, predictions, and problem identification.</p>	Troubleshooting Project Management (budgeting, cost needs analysis, limitations)	Solving multistep problems (1) Decimals (1) Whole numbers (1) Graphs/functions (maximum, minimum, range, domain) (2) Measures of central tendency (2) Algebraic equations	6.NS.2; 6.NS.3; 7.EE.3; 6.NS.5; 7.NS.1; 7.NS.2; 7.NS.3; 6.EE.2; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	A.APR.1; A.APR.7; N.RN.3; A.CED.4; S.ID.5; S.IC.3; N.Q.1; N.Q.2; N.Q.3; S.ID.6
	<p>III. PROBLEM-SOLVING AND CRITICAL THINKING A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation. 1. Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate). 2. Employ critical thinking and interpersonal skills to resolve conflicts with staff and/or customers. 4. Conduct technical research to gather information necessary for decision-making. B. Implement problem-solving processes to evaluate and verify the nature of problems in the IT industry. 1. Explain information systems theory and practice. 2. Explain information systems problem-solving techniques and approaches. 3. Evaluate information systems problem-solving techniques and approaches.</p>	Troubleshooting Project Management (budgeting, cost needs analysis, limitations) RFP (request for proposal)	Solving multistep problems (1) Decimals (1) Whole numbers (1) Graphs/functions (maximum, minimum, range, domain) (2) Measures of central tendency (2) Algebraic equations	6.NS.2; 6.NS.3; 7.EE.3; 6.NS.5; 7.NS.1; 7.NS.2; 7.NS.3; 6.EE.2; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	A.APR.1; A.APR.7; N.RN.3; A.CED.4; S.ID.5; S.IC.3; N.Q.1; N.Q.2; N.Q.3; S.ID.6

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	<p>IV. INFORMATION TECHNOLOGY APPLICATIONS</p> <p>B. Employ technological tools to expedite workflow.</p> <p>26. Use installation and operation manuals. 27. Troubleshoot computer driven equipment and machines. 28. Access support as needed to maintain operation of computer driven equipment and machines.</p>	<p>Troubleshooting Error codes Hexadecimal (not converting yet) Electrical draw of components</p>	<p>Number systems (understanding that there are different systems from decimal, ex binary and hexadecimal) (1) Algebraic equations (power) (1)</p>	<p>6.NS.2; 6.NS.3; 7.NS.1; 7.EE.3; 6.EE.2; 7.EE.3</p>	<p>A.APR.1; A.APR.7; N.RN.3; N.Q.1; A.CED.4</p>
	<p>X. TECHNICAL SKILLS</p> <p>C. Demonstrate knowledge of the hardware components associated with information systems.</p> <p>5. Use available reference tools as appropriate.</p> <p>H. Access and use Internet services when completing IT related tasks to service and update IT systems.</p> <p>2. Troubleshoot Internet connection problems.</p> <p>I. Install and configure software programs to maintain and update IT systems.</p> <p>4. Resolve problems with installation if they occur.</p> <p>L. Perform standard computer backup procedures to protect IT information.</p> <p>1. Explain the need for regular backup procedures. 2. Configure, perform and maintain backup procedures.</p> <p>N. Maintain computer systems to ensure optimal IT system functioning.</p> <p>2. Ensure that system is functioning optimally. 3. Fix and document system problems.</p> <p>O. Provide IT support and training to maintain proper network functioning.</p> <p>1. Provide Help Desk service to computer users within the organization.</p>	<p>IP addressing Disc space limitations Backup procedures Troubleshooting PC maintenance</p>	<p>Optimization (2) Units (temperatures) (1) Modulus (1) Rates of change (2) Word problems (1) Exponents (1) Fractions (+-) (2) Analyzing graphs (2)</p>	<p>6.NS.2; 6.NS.3; 7.EE.3; 6.RP.3; 7.RP.1; 6.NS.1; 6.EE.2; 7.NS.1; 7.NS.2; 7.NS.3; 7.EE.3; 6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4</p>	<p>A.APR.1; A.APR.7; N.RN.3; F.IF.4; F.IF.6; S.ID.7; F.BF.5; S.ID.6; F.LE.2; F.LE.3; S.ID.5; S.IC.3; N.Q.1; N.Q.2; N.Q.3; S.ID.6</p>

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	2. Provide training for basic computer use within the organization.				
	XI. NETWORK SYSTEMS PATHWAY F. Perform network maintenance and user support services to maintain a network system. 2. Perform technical support duties. 3. Apply software upgrades, service packs and patches. 4. Perform standard computer backup procedures. 6. Troubleshoot network system problems. 7. Troubleshoot data communications.	Troubleshooting System components IP addressing Disc space limitations Backup procedures	Optimization (2) Units (temperatures) (1) Modulus (1) Rates of change (2) Word problems (1) Exponents (1) Fractions (+-) (2) Analyzing graphs (2)	6.NS.2; 6.NS.3; 7.EE.3; 6.RP.3; 7.RP.1; 6.NS.1; 6.EE.2; 7.NS.1; 7.NS.2; 7.NS.3; 7.EE.3; 6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	A.APR.1; A.APR.7; N.RN.3; F.IF.4; F.IF.6; S.ID.7; F.BF.5; S.ID.6; F.LE.2; F.LE.3; S.ID.5; S.IC.3; N.Q.1; N.Q.2; N.Q.3
3	OPERATING SYSTEM & SOFTWARE				
	IV. INFORMATION TECHNOLOGY APPLICATIONS A. Use Personal Information Management (PIM) applications to increase workplace efficiency. 1. Manage personal schedules and contact information. 2. Create memos and notes. B. Employ technological tools to expedite workflow. 1. Use information technology tools to manage and perform work responsibilities. 2. Use email to share files and documents. 3. Identify the functions and purpose of email systems. 4. Use email to communicate within and across organizations. 5. Access and navigate Internet (e.g., use a web browser). 6. Search for information and resources. 7. Evaluate Internet resources for reliability and validity. 8. Prepare simple documents and other business communications. 9. Prepare reports and other business communications by integrating graphics and				

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	<p>other non-text elements.</p> <p>10. Prepare complex multi-media publications.</p> <p>11. Prepare presentations for training, sales and information sharing.</p> <p>12. Deliver presentations with supporting materials.</p> <p>13. Create a spreadsheet.</p> <p>14. Perform calculations and analyses on data using a spreadsheet.</p> <p>15. Manipulate data elements.</p> <p>16. Manage interrelated data elements.</p> <p>17. Analyze interrelated data elements.</p> <p>18. Generate reports showing interrelated data elements.</p> <p>19. Facilitate group work through management of shared schedule and contact information.</p> <p>20. Facilitate group work through management of shared files and online information.</p> <p>21. Facilitate group work through instant messaging or virtual meetings.</p> <p>22. Manage computer operations.</p> <p>23. Manage file storage.</p> <p>24. Compress or alter files.</p>	<p>Excel, ppt, Finances, sales Network architecture Compression</p>	<p>Algebraic equations Variables Charts Graphs Ratio Proportions Whole numbers (=x/) Decimals (=x/)</p>	<p>6.RP.1; 6.RP.2; 6.RP.3; 7.RP.1; 7.RP.2; 7.RP.3; 6.NS.2; 6.NS.3; 6.NS.5; 7.NS.1; 7.NS.2; 7.NS.3; 7.EE.3; 6.EE.6; 6.EE.7; 6.EE.8; 6.EE.9; 7.EE.1; 7.EE.2; 7.EE.3; 7.EE.4; 8.EE.7; 8.EE.8; 8.F.4; 6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4</p>	<p>A.APR.1; A.APR.7; N.RN.3; N.Q.1; G.MG.3; A.CED.1; A.CED.2; A.CED.3; A.CED.4; A.REI.3; A.REI.4; A.REI.10; F.LE.1; F.LE.2; F.LE.5; F.IF.5; A.SSE.1; F.BF.1; S.ID.6; S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1</p>
	<p>X. TECHNICAL SKILLS</p> <p>C. Demonstrate knowledge of the hardware components associated with information systems.</p> <p>1. Explain the fundamentals of operating systems.</p> <p>D. Compare classes of software associated with the development and maintenance information systems to develop software and maintain computer systems.</p> <p>1. Explain the key functions and applications of software.</p> <p>2. Describe the range of languages used in software development.</p> <p>3. Summarize how data is organized in software development.</p> <p>4. Explain new and emerging classes of software.</p> <p>H. Access and use Internet services when completing IT related tasks to service and</p>	<p>D3- partitioning</p> <p>I1—bus speeds</p> <p>Clock rate</p> <p>Power supplies</p>	<p>Whole numbers (+x/) (1)</p> <p>Proportion (1)</p> <p>Pie charts (1)</p> <p>Comparison (<=>) (1)</p>	<p>6.NS.2; 6.NS.3; 7.NS.1; 7.EE.3; 6.RP.1; 6.RP.2; 6.RP.3; 7.RP.1; 7.RP.2; 7.RP.3; 6.SP.4</p>	<p>A.APR.1; A.APR.7; N.RN.3; N.Q.1</p>

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	<p>update IT systems.</p> <ol style="list-style-type: none"> 3. Explain the components of Internet software. 4. Install Internet software for use on an operating system. <p>I. Install and configure software programs to maintain and update IT systems.</p> <ol style="list-style-type: none"> 1. Verify that hardware and software system components are compatible prior to performing installation. 3. Perform installation accurately and completely, using available resources as needed. 5. Perform customization as requested. <p>J. Demonstrate knowledge of Web page basics to build an understanding of Web page design and functioning.</p> <ol style="list-style-type: none"> 1. Explain the features and functions of Web browsing software. 2. Explain the features and functions of Web page design software. <p>K. Employ IT knowledge and procedures when configuring or modifying an operating system to ensure optimal system functioning.</p> <ol style="list-style-type: none"> 1. Configure/modify system as needed. 2. Use operating system principles to ensure optimal system function. 3. Configure systems to provide optimal system interfaces. <p>N. Maintain computer systems to ensure optimal IT system functioning.</p> <ol style="list-style-type: none"> 1. Implement queries and reports to provide access to critical system information. 				
	<p>XI. NETWORK SYSTEMS PATHWAY</p> <p>C. Design a network system using technologies, tools and standards to demonstrate a basic understanding of network architecture.</p> <ol style="list-style-type: none"> 9. Characterize the use of Network Operating Systems. <p>D. Perform network system installation and configuration to launch a network system.</p> <ol style="list-style-type: none"> 2. Install a Network Operating System. 3. Configure a Network Operating System. 	<p>Disk space Gigabytes megabytes</p>	<p>Whole numbers (1) Unit conversion (1)</p>	<p>6.NS.2; 6.NS.3; 7.NS.1; 7.EE.3</p>	<p>A.APR.1; A.APR.7; N.RN.3; N.Q.1</p>

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4	SAFETY				
	<p>VI. SAFETY, HEALTH AND ENVIRONMENTAL</p> <p>A. Implement personal and jobsite safety rules and regulations to maintain safe and healthful working conditions and environments.</p> <ol style="list-style-type: none"> 1. Assess workplace conditions with regard to safety and health. 2. Select appropriate personal protective equipment as needed for a safe workplace/jobsite. 3. Employ a safety hierarchy and communication system within the workplace/jobsite. 4. Implement safety precautions to maintain a safe worksite. <p>B. Complete work tasks in accordance with employee rights and responsibilities and employers obligations to maintain workplace safety and health.</p> <ol style="list-style-type: none"> 1. Identify rules and laws designed to promote safety and health in the workplace. 2. State the rationale of rules and laws designed to promote safety and health. <p>C. Employ emergency procedures as necessary to provide aid in workplace accidents.</p> <ol style="list-style-type: none"> 1. Use knowledge of First Aid procedures as necessary. 2. Use knowledge of CPR procedures as necessary. 3. Use safety equipment as necessary. <p>D. Employ knowledge of response techniques to create a disaster and/or emergency response plan.</p> <ol style="list-style-type: none"> 1. Complete an assessment of an emergency and/or disaster situation. 2. Create an emergency and/or disaster plan. 				
5	SECURITY				

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	<p>IV. INFORMATION TECHNOLOGY APPLICATIONS</p> <p>C. Demonstrate Digital Citizenship</p> <ol style="list-style-type: none"> 1. Identify legal and ethical issues related to the use of information and communication technologies (e.g., properly selecting and citing resources) 2. Discuss possible long-range effects of unethical uses of technology (e.g., virus spreading, file pirating, hacking) on cultures and society 3. Discuss and demonstrate proper netiquette in online communications 4. Identify ways that individuals can protect their technology systems from unethical or unscrupulous users 5. Create appropriate citations for resources when presenting research findings 6. Discuss and adhere to fair use policies and copyright guidelines 	<p>Viruses, exponential growth</p> <p>C2—cost benefit analysis</p> <p>C4- firewalls</p> <p>IP addressing</p>	<p>Exponents (2)</p> <p>Data interpretations, charts, graphs, etc (3)</p>	<p>6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4</p>	<p>F.BF.5; S.ID.6; F.LE.2; F.LE.3; S.ID.5; S.IC.3</p>
	<p>X. TECHNICAL SKILLS</p> <p>H. Access and use Internet services when completing IT related tasks to service and update IT systems.</p> <ol style="list-style-type: none"> 5. Describe virus protection procedures. 6. Explain cookies and adware on an internet connected computer system. <p>I. Install and configure software programs to maintain and update IT systems.</p> <ol style="list-style-type: none"> 2. Verify that software to be installed is licensed prior to performing installation. <p>M. Recognize and analyze potential IT security threats to develop and maintain security requirements.</p> <ol style="list-style-type: none"> 1. Describe potential security threats to information systems. 2. Identify the range of security needs and the problems that can occur due to security lapses. 3. Assess security threats. 4. Develop plans to address security threats. 5. Implement plans to address security procedures. 6. Document security procedures. <p>Q. Describe the use of computer forensics to prevent and solve information technology crimes and security breaches.</p>	<p>Flowcharts</p> <p>Forensic investigation</p>	<p>Logic (1)</p> <p>Flowcharts</p>		<p>S.CP.1</p>

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	<ol style="list-style-type: none"> 1. Describe the role of computer forensic investigators. 2. Demonstrate the effective use of basic computer applications relating to forensics investigations. 3. Identify criminal activity in relationship to cyber crime, the Internet, and Internet trafficking. 				
6	OPERATIONAL PROCEDURE				
	I. ACADEMIC FOUNDATIONS A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities. <ol style="list-style-type: none"> 4. Evaluate and use information resources to accomplish specific occupational tasks. 				
	II. COMMUNICATIONS A. Develop and interpret tables, charts, and figures to support written and oral communications. <ol style="list-style-type: none"> 1. Create tables, charts, and figures to support written and oral communications. 2. Interpret tables, charts, and figures used to support written and oral communication. D. Exhibit public relations skills to increase internal and external customer/client satisfaction. <ol style="list-style-type: none"> 1. Communicate effectively when developing positive customer/client relationships. 	Tables Charts	Data analysis (1) Create visual displays of data (1)	6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	S.ID.5; S.IC.3
	III. PROBLEM-SOLVING AND CRITICAL THINKING C. Use product/service design processes and guidelines to produce a quality IT product/service. <ol style="list-style-type: none"> 5. Maintain the reliability of new products/services. 6. Demonstrate the use of design and color principles. 	Baseline (performance)	Comparisons (2) Percent increase and decrease (2)	7.EE.2; 7.EE.3	
	V. SYSTEMS A. Describe the nature and types of business organizations to build an understanding of the scope of organizations.				

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	<p>1. Describe the types and functions of businesses.</p> <p>2. Explain the functions and interactions of common departments within a business.</p> <p>C. Implement quality control systems and practices to ensure quality products and services.</p> <p>1. Describe quality control standards and practices common to the workplace.</p>				
	<p>VIII. ETHICS AND LEGAL RESPONSIBILITIES</p> <p>A. Know and understand the importance of professional ethics and legal responsibilities.</p> <p>1. Apply ethical reasoning to a variety of workplace situations in order to make ethical decisions.</p> <p>2. Interpret and explain written organizational policies and procedures to help employees perform their jobs according to employer rules and expectations.</p> <p>3. Explain legal issues faced by IT professionals.</p>				
	<p>X. TECHNICAL SKILLS</p> <p>1. Install and configure software programs to maintain and update IT systems.</p> <p>1. Develop goals and objectives.</p> <p>6. Document procedures, using clear and effective notes, for future use.</p> <p>K. Employ IT knowledge and procedures when configuring or modifying an operating system to ensure optimal system functioning.</p> <p>4. Document procedures and actions.</p> <p>P. Identify and describe quality assurance concepts to develop an understanding of the requirements for quality IT products/services.</p> <p>1. Explain the history and standards of key quality management initiatives.</p> <p>3. Summarize the elements of a quality management system.</p>	<p>Create flowcharts</p> <p>Time calculations</p>	<p>Time calculations (1)</p>		
	<p>XI. NETWORK SYSTEMS PATHWAY</p> <p>E. Perform network administration and monitoring to maintain a network system.</p> <p>2. Demonstrate knowledge of disaster recovery and business continuance.</p>	<p>Backup procedures</p>	<p>Disk space calculations</p>		

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7	NETWORK TECHNOLOGIES				
	I. ACADEMIC FOUNDATIONS B. Demonstrate mathematics knowledge and skills required to pursue the full range of post-secondary education and career opportunities. <ol style="list-style-type: none"> 1. Identify whole numbers, decimals, and fractions. 2. Demonstrate knowledge of basic arithmetic operations such as addition, subtraction, multiplication, and division. 3. Demonstrate use of relational expressions such as equal to, not equal, greater than, less than, etc. 	IP addressing Subnetting Access lists Disk space Protocol metrics	Whole numbers (1) Decimals (1) Fractions (1) Comparison (\leq) (1) Algebraic equations(2) Boolean logic (2) Modulus (2) Unit conversions (2) Percent increase and decrease (2) Exponents (2) Linear measure (2)	6.NS.1; 6.EE.2; 7.NS.1; 7.NS.2; 7.NS.3; 6.NS.2; 6.NS.3; 6.NS.5; 7.EE.2; 7.EE.3; 6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3	A.APR.1; A.APR.7; N.RN.3; N.Q.1; A.CED.4; F.BF.5; S.ID.6; F.LE.2; F.LE.3; S.CP.1
	IV. INFORMATION TECHNOLOGY APPLICATIONS B. Employ technological tools to expedite workflow. <ol style="list-style-type: none"> 12. Deliver presentations with supporting materials. 	Tables Charts	Data analysis (2) Create visual displays of data (2)	6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	S.ID.5; S.IC.3
	V. SYSTEMS C. Implement quality control systems and practices to ensure quality products and services. <ol style="list-style-type: none"> 3. Diagnose and make necessary corrections or improvements to a technical system in a business, industry, or simulated work place setting. 	Troubleshooting			
	X. TECHNICAL SKILLS C. Demonstrate knowledge of the hardware components associated with information systems. <ol style="list-style-type: none"> 2. Explain the role of number systems in information systems. E. Identify and compare new IT trends and	C2 Binary, decimal, hexadecimal, octal (nibbles, bytes, bits, crumbs)	Unit conversion (1)	6.NS.2; 6.NS.3; 7.NS.1; 6.RP.2; 6.RP.3; 7.EE.2; 7.EE.3; 6.EE.1; 8.EE.1; 8.EE.2;	A.APR.1; A.APR.7; N.RN.3; N.Q.1; F.BF.5; S.ID.6; F.LE.2; F.LE.3; F.IF.7

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	<p>technologies to build an understanding of their potential influence on IT practices.</p> <ol style="list-style-type: none"> 1. Explain measurement techniques for increased productivity due to information support implementation. 2. Identify new IT technologies. 3. Assess the potential importance and impact of new IT technologies in the future. <p>F. Summarize basic data communications components and trends to maintain and update IT systems.</p> <ol style="list-style-type: none"> 1. Explain data communications procedures, equipment and media. 2. Explain data transmission codes and protocols. 3. Explain the differences between local and wide area networks. 4. Summarize data communication trends and issues. <p>H. Access and use Internet services when completing IT related tasks to service and update IT systems.</p> <ol style="list-style-type: none"> 1. Demonstrate the use of an Internet connection. <p>J. Demonstrate knowledge of Web page basics to build an understanding of Web page design and functioning.</p> <ol style="list-style-type: none"> 3. Compare and contrast clients and servers. 4. Describe how bandwidth affects data transmission and on-screen image. 	<p>E1- Bandwidth Attenuation (range, distance from source, exponential and logarithmic decay)</p> <p>F2- IP addressing, subnetting F3- Network address translation</p> <p>J4- net neutrality</p>	<p>Percent saturation (2) Exponential and Logarithmic decay (1)</p> <p>Inverse relationships, direct relationships</p>	<p>8.EE.3; 8.EE.5</p>	
	<p>XI. NETWORK SYSTEMS PATHWAY</p> <p>C. Design a network system using technologies, tools and standards to demonstrate a basic understanding of network architecture.</p> <ol style="list-style-type: none"> 1. Demonstrate knowledge of the basics of network architecture. 3. Implement common network computing platforms. 7. Use WAN systems in network development. 	<p>Bandwidth Attenuation (range, distance from source, exponential and logarithmic decay)</p> <p>IP addressing, subnetting Network address translation</p>	<p>Percent saturation (2) Exponential and Logarithmic decay (1)</p> <p>Inverse relationships, direct relationships</p>	<p>6.RP.2; 6.RP.3; 7.EE.2; 7.EE.3; 6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3; 8.EE.5</p>	<p>F.BF.5; S.ID.6; F.LE.2; F.LE.3; F.IF.7</p>

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		net neutrality			
8	NETWORK HARDWARE & TOOLS				
	I. ACADEMIC FOUNDATIONS A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities. 5. Use correct grammar, punctuation and terminology to write and edit documents				
	III. PROBLEM-SOLVING AND CRITICAL THINKING A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation. 4. Conduct technical research to gather information necessary for decision-making.	Problem solving Research Design and build to specs	Reading charts, graphs, displays (1) Budgeting, money (2)	6.NS.2; 6.NS.3; 7.NS.1; 7.EE.3; 6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4	A.APR.1; A.APR.7; N.RN.3; N.Q.1; S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1
	IV. INFORMATION TECHNOLOGY APPLICATION B. Employ technological tools to expedite workflow. 1. Use information technology tools to manage and perform work responsibilities. 7. Evaluate Internet resources for reliability and validity. 10. Prepare complex multi-media publications.				
	X. TECHNICAL SKILLS K. Employ IT knowledge and procedures when configuring or modifying an operating system to ensure optimal system functioning. 3. Use available reference tools as appropriate.				
	XI. NETWORK SYSTEMS PATHWAY C. Design a network system using technologies, tools and standards to				

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	<p>demonstrate a basic understanding of network architecture.</p> <p>2. Demonstrate knowledge of basic network classifications and topologies.</p> <p>4. Implement appropriate LAN physical media.</p> <p>5. Characterize network connectivity basis and transmission line applications.</p> <p>D. Perform network system installation and configuration to launch a network system.</p> <p>1. Install a network infrastructure.</p> <p>E. Perform network administration and monitoring to maintain a network system.</p> <p>1. Monitor network performance including information management and infrastructure.</p>	<p>Troubleshooting addressing (subnetting) networking protocols, OSI model</p> <p>determine bandwidth needs</p> <p>addressing (assigning IP address to machine)</p> <p>Troubleshooting Topologies (logical and physical)</p> <p>cable building and testing</p>	<p>exponential functions (1)</p> <p>statistical analysis of data (1)</p> <p>unit (bits per second) (1)</p> <p>multi-step problem solving (1)</p> <p>word problems/context problems (1)</p>	<p>6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 7.SP.5; 8.SP.1; 8.SP.3; 8.SP.4</p>	<p>F.BF.5; S.ID.6; F.LE.2; F.LE.3; S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.IC.1; S.IC.3; S.IC.4; S.IC.6; S.MD.1; S.CP.1; N.Q.1; N.Q.2; N.Q.3</p>
9	PERSONAL SKILLS & CUSTOMER SERVICE				
	<p>I. ACADEMIC FOUNDATIONS</p> <p>A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities.</p> <p>1. Select and employ appropriate reading and communication strategies to learn and use technical concepts and vocabulary in practice.</p> <p>3. Locate, organize and reference written information from various sources to communicate with co-workers and clients/participants.</p> <p>5. Use correct grammar, punctuation and terminology to write and edit documents.</p> <p>6. Develop and deliver formal and informal presentations using appropriate media to engage and inform audiences.</p> <p>7. Interpret verbal and nonverbal cues/behaviors to enhance communication with co-workers and clients/participants.</p>				

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	<p>II. COMMUNICATIONS</p> <p>A. Develop and interpret tables, charts, and figures to support written and oral communications.</p> <p>3. Effectively use organizational protocols and systems to fulfill customer service requirements.</p> <p>B. Apply active listening skills to obtain and clarify information.</p> <p>1. Interpret a given verbal message/information.</p> <p>2. Respond with restatement and clarification techniques to clarify information.</p> <p>3. Model behaviors that demonstrate active listening.</p> <p>4. Schedule customer appointments.</p> <p>D. Exhibit public relations skills to increase internal and external customer/client satisfaction.</p> <p>1. Communicate effectively when developing positive customer/client relationships.</p> <p>2. Identify organization's products and services (including own strengths as an agent of the company).</p> <p>3. Use correct grammar to communicate verbally.</p> <p>4. Listen to a presentation and record important information. Report back identifying central themes and use key points to explain how the message applies to a similar situation.</p>				
	<p>III. PROBLEM SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</p> <p>1. Employ critical thinking skills independently and in teams to solve problems and make decisions (e.g., analyze, synthesize and evaluate).</p>	Problem solving	Multi-step problems (1) Statistical analysis (3)	6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 7.SP.5; 8.SP.1; 8.SP.3; 8.SP.4	S.ID.1; S.ID.2; S.ID.3; S.ID.5; S.ID.6; S.IC.1; S.IC.3; S.IC.4; S.IC.6; S.MD.1; S.CP.1; N.Q.1; N.Q.2; N.Q.3
	<p>VII. LEADERSHIP AND TEAMWORK</p> <p>A. Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p> <p>3. Employ teamwork skills to achieve collective goals and use team members' talents effectively.</p> <p>4. Establish and maintain effective working</p>				

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	relationships with all levels of personnel and other departments in order to accomplish objectives and tasks.				
	<p>VIII. ETHICS AND LEGAL RESPONSIBILITIES</p> <p>A. Know and understand the importance of professional ethics and legal responsibilities.</p> <p>2. Interpret and explain written organizational policies and procedures to help employees perform their jobs according to employer rules and expectations.</p>				
	<p>IX. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>A. Know and understand the importance of employability skills.</p> <p>1. Identify and demonstrate positive work behaviors and personal qualities needed to be employable.</p> <p>2. Manage resources in relation to the position (i.e. budget, supplies, computer, etc).</p> <p>B. Explore, plan, and effectively manage careers.</p> <p>2. Identify and explore career opportunities in one or more career pathways to build an understanding of the opportunities available in the cluster.</p> <p>3. Recognize and act upon requirements for career advancement to plan for continuing education and training.</p> <p>4. Continue professional development to keep current on relevant trends and information within the industry.</p> <p>5. Examine licensing, certification and credentialing requirements at the national, state and local levels to maintain compliance with industry requirements.</p> <p>6. Examine employment opportunities in entrepreneurship to consider entrepreneurship as an option for career planning.</p> <p>C. Demonstrate skills related to seeking and applying for employment to find and obtain a desired job.</p> <p>1. Use multiple resources to locate job opportunities.</p> <p>2. Prepare a résumé.</p> <p>3. Prepare a letter of application.</p> <p>4. Complete an employment application.</p>	Budget B5- cost benefit analysis of certifications	Decimals (+-x/) (1) Forecasting, (2) Graphs (1) Data analysis (1) Measures of central tendency (2)	6.NS.2; 6.NS.3; 6.NS.5; 7.NS.1; 7.NS.2; 7.NS.3; 7.EE.3; 6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 6.SP.5; 6.SP.1; 6.SP.2	S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.5; S.ID.1; S.ID.2

Segment	CTE Segments/Performance Elements	CTE Concepts	Math Concepts	Common Core Math Standards Middle School	Common Core Math Standards High School
	<p>5. Interview for employment.</p> <p>6. List the standards and qualifications that must be met in order to enter a given industry.</p> <p>7. Employ critical thinking and decision-making skills to exhibit qualifications to a potential employer.</p> <p>8. Maintain a career portfolio to document knowledge, skills and experience in a career field.</p> <p>9. Demonstrate skills in evaluating and comparing employment opportunities in order to accept employment positions that match career goals.</p> <p>10. Identify and exhibit traits for retaining employment to maintain employment once secured.</p>				
10	NETWORK MANAGEMENT				
	<p>I. ACADEMIC FOUNDATIONS</p> <p>A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities.</p> <p>6. Develop and deliver formal and informal presentations using appropriate media to engage and inform audiences.</p> <p>B. Demonstrate mathematics knowledge and skills required to pursue the full range of post-secondary education and career opportunities.</p> <p>4. Apply data and measurements to solve a problem.</p> <p>5. Analyze Mathematical problem statements for missing and/or irrelevant data.</p> <p>6. Construct charts/tables/graphs from functions and data.</p> <p>7. Analyze data when interpreting operational documents.</p>	<p>A6- display, charts graphs, statistics</p> <p>B—Cabling</p> <p>IP addressing</p> <p>Subnetting</p> <p>Access lists</p> <p>Disk space</p> <p>Protocol metrics</p>	<p>Measurement (length of cable runs)</p> <p>Problem solving</p> <p>Charts, tables, graphs</p> <p>Display of data</p> <p>Whole numbers (1)</p> <p>Decimals (1)</p> <p>Fractions (1)</p> <p>Comparison (<=>) (1)</p> <p>Algebraic equations(2)</p> <p>Boolean logic (2)</p> <p>Modulus (2)</p> <p>Unit conversions (2)</p> <p>Percent increase and decrease (2)</p> <p>Exponents (2)</p> <p>Linear measure (2)</p>	<p>6.EE.2; 6.EE.3; 6.SP.4; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4; 8.SP.3; 8.SP.4; 6.NS.1; 7.NS.1; 7.NS.2; 7.NS.3; 6.NS.2; 6.NS.3; 6.NS.5; 7.EE.2; 7.EE.3; 6.EE.1; 8.EE.1; 8.EE.2; 8.EE.3</p>	<p>N.Q.1; N.Q.2; N.Q.3; S.ID.6; S.IC.1; S.IC.2; S.IC.3; S.IC.4; S.IC.5; S.IC.6; S.ID.1; A.APR.1; A.APR.7; N.RN.3; A.CED.4; F.BF.5; S.ID.6; F.LE.2; F.LE.3</p>

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	<p>V. SYSTEMS</p> <p>A. Describe the nature and types of business organizations to build an understanding of the scope of organizations.</p> <p>3. Summarize the importance of cross-functional teams in achieving IT project goals.</p> <p>B. Employ project management knowledge to oversee IT projects.</p> <p>1. Implement project methodologies to manage information system projects.</p> <p>2. Define scope of work to achieve individual and group goals.</p> <p>3. Develop time and activity plans to achieve objectives.</p> <p>C. Implement quality control systems and practices to ensure quality products and services.</p> <p>2. Integrate IT into various types of business models.</p>	timelines	Time calculations (1)		
	<p>IX. EMPLOYABILITY AND CAREER DEVELOPMENT</p> <p>B. Explore, plan, and effectively manage careers.</p> <p>5. Examine licensing, certification and credentialing requirements at the national, state and local levels to maintain compliance with industry requirements.</p> <p>C. Demonstrate skills related to seeking and applying for employment to find and obtain a desired job.</p> <p>11. Demonstrate understanding of the impact of IT on businesses.</p>	Budgeting, Cost benefit analysis	Decimals (2) Data analysis (2) Forecasting (2)	6.NS.2; 6.NS.3; 6.NS.5; 7.NS.1; 7.NS.2; 7.NS.3; 7.EE.3; 6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	S.ID.5; S.IC.3
	<p>X. TECHNICAL SKILLS</p> <p>B. Employ information management techniques and strategies in the workplace to assist in decision-making.</p> <p>2. Describe the nature and scope of information management.</p> <p>3. Maintain records to facilitate ongoing business operations.</p> <p>G. Demonstrate technical knowledge of the Internet to develop and maintain IT systems.</p> <p>1. Describe Internet protocols.</p> <p>2. Explain Domain Name Server (DNS).</p> <p>3. Summarize Internet security issues and</p>				

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	<p>systems available for addressing them.</p> <p>J. Demonstrate knowledge of Web page basics to build an understanding of Web page design and functioning.</p> <p>5. Compare the benefits of internal and external Web hosting.</p>				
	<p>XI. NETWORK SYSTEMS PATHWAY</p> <p>C. Design a network system using technologies, tools and standards to demonstrate a basic understanding of network architecture.</p> <p>6. Demonstrate knowledge of communication standards for networks.</p> <p>8. Implement network security systems.</p> <p>E. Perform network administration and monitoring to maintain a network system.</p> <p>3. Perform network system administration tasks.</p> <p>F. Perform network maintenance and user support services to maintain a network system.</p> <p>1. Identify various methods of technical support used to maintain and support a network system.</p> <p>5. Perform network system maintenance.</p>	<p>Subnetting</p> <p>IP Addressing</p> <p>Flowcharts</p> <p>Penetration</p> <p>Integrity</p> <p>Availability</p> <p>Control versus confidentiality</p> <p>Troubleshooting</p> <p>Maintenance plans</p>	<p>Whole numbers (=x/)</p> <p>(1)</p> <p>Modulus (1)</p> <p>(Binary, hexadecimal)</p> <p>Conversion between systems (1)</p> <p>Problem solving (1)</p> <p>Algebraic equations (1)</p> <p>Word problems (1)</p>	<p>6.NS.2; 6.NS.3;</p> <p>7.NS.1; 7.EE.3;</p> <p>6.EE.2; 7.EE.3</p>	<p>A.APR.1; A.APR.7;</p> <p>N.RN.3; A.CED.4;</p> <p>N.Q.1; N.Q.2; N.Q.3;</p> <p>S.ID.6</p>
11	TEAMWORK & LEADERSHIP				
	<p>I. ACADEMIC FOUNDATIONS</p> <p>A. Demonstrate language arts knowledge and skills required to pursue the full range of post-secondary education and career opportunities.</p> <p>2. Demonstrate use of the concepts, strategies, and systems for obtaining and conveying ideas and information to enhance communication in the workplace.</p> <p>4. Evaluate and use information resources to accomplish specific occupational tasks.</p> <p>5. Use correct grammar, punctuation and terminology to write and edit documents.</p> <p>6. Develop and deliver formal and informal presentations using appropriate media to engage and inform audiences.</p>				

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	<p>II. COMMUNICATIONS</p> <p>C. Listen to and speak with diverse individuals to enhance communication skills.</p> <ol style="list-style-type: none"> 1. Apply factors and strategies for communicating with a diverse workforce. 2. Demonstrate ability to communicate and resolve conflicts within a diverse workforce. 				
	<p>III. PROBLEM-SOLVING AND CRITICAL THINKING</p> <p>A. Solve problems using critical thinking skills (analyze, synthesize, and evaluate) independently and in teams. Solve problems using creativity and innovation.</p> <ol style="list-style-type: none"> 3. Identify, write and monitor workplace performance goals to guide progress in assigned areas of responsibility and accountability. <p>C. Use product/service design processes and guidelines to produce a quality IT product/service.</p> <ol style="list-style-type: none"> 1. Summarize the process of IT product/service design. 2. Plan for products/services using reliability factors. 3. Create products/services using reliability factors. 4. Test new products/services for reliability. 5. Maintain the reliability of new products/services. 	Baseline Reliability	Percent (1)	6.RP.2; 6.RP.3; 7.EE.2; 7.EE.3	
	<p>VII. LEADERSHIP AND TEAMWORK</p> <p>A. Use leadership and teamwork skills in collaborating with others to accomplish organizational goals and objectives.</p> <ol style="list-style-type: none"> 1. Employ leadership skills to accomplish organizational goals and objectives. 2. Employ organizational and staff development skills to foster positive working relationships and accomplish organizational goals. 3. Employ teamwork skills to achieve collective goals and use team members' talents effectively. 4. Establish and maintain effective working relationships with all levels of personnel and other departments in order to accomplish objectives and tasks. 5. Conduct and participate in meetings to accomplish work tasks. 6. Employ mentoring skills to inspire and 				

Segment	CTE Segments/Performance Elements	CTE Concepts	Math Concepts	Common Core Math Standards Middle School	Common Core Math Standards High School
	teach others.				
	IX. EMPLOYABILITY AND CAREER DEVELOPMENT B. Explore, plan, and effectively manage careers. 1. Explore, plan, and effectively manage careers.				
	X. TECHNICAL SKILLS A. Employ information management techniques and strategies in the workplace to assist in decision-making. 1. Use information literacy skills when accessing, evaluating and disseminating information. B. Employ planning and time management skills and tools to enhance results and complete work tasks. 1. Develop goals and objectives. 2. Prioritize tasks to be completed. 3. Develop timelines using time management knowledge and skills. 4. Use project-management skills to improve workflow and minimize costs. P. Identify and describe quality assurance concepts to develop an understanding of the requirements for quality IT products/services. 2. Explain the terminology, role and benefits of quality within an organization.	Timelines Planning Cost management	Time calculations (1) Money (decimals) (1) Multi-step problems (1) Unit measurement (1) calculations (pay rate per day, hour, year) (2)	6.NS.2; 6.NS.3; 6.NS.5; 7.NS.1; 7.NS.2; 7.NS.3; 7.EE.3	A.APR.1; A.APR.7; N.RN.3; N.Q.1
12	NETWORK ANALYSIS & DESIGN				
	XI. NETWORK SYSTEMS PATHWAY A. Identify and analyze customer/organizational network system needs and requirements to design a network. 1. Gather data to identify customer/organizational requirements. 2. Conduct needs analysis. 3. Develop networking requirements specifications. 4. Analyze requirements/specifications using current IT approaches. B. Analyze a network system to determine if it meets specifications. 1. Analyze the computer site environment. 2. Analyze network security systems.	Data collection Needs analysis Networking requirements	Data collection and analysis (1) Maximums and minimums (ranges) (1) Unit rate (speed, density) (1)	6.SP.5; 7.SP.2; 7.SP.3; 7.SP.4	S.ID.5; S.IC.3; N.Q.1; N.Q.2; N.Q.3; S.ID.6

