DEPARTMENT: Mathematics COURSE: PC Hardware

Curriculum Development Timeline

School: Ocean Township High School

Course: PC Hardware

Department: Mathematics

Board Approval	Supervisor	Notes
August 2013	Janet Bluefield	Born Date
September 2017	Amanda Maltese	Revisions
August 2019	Nichole Kerney	Review
August 2022	Gerard Marrone	Alignment to Standards

Township of Ocean Schools

Assistant Superintendent
Office of Teaching and Learning

SPARTAN MISSION:
Meeting the needs of all students with a proud tradition of academic excellence.

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Township of Ocean Pacing Guide			
Week	Marking Period 1	**Week**	Marking Period 3
1	Path of the PC Technician	11	Networking, Browsing & Security
2	Visible PC, Networks, Windows, Mac, and Linux Operating Systems	12	Hands-on PC Build #3 High End
3	The Visible PC, Networks, Windows, Mac, and Linux Operating Systems	13	Hands-on PC Build #3 High End
4	Inside the PC	14	Monitors, Keyboards & Mice
5	Inside the PC	15	PC Pitfalls & Place in History
Week	Marking Period 2	**Week**	Marking Period 4
6	Hands-on PC Build #1 AMD	16	3rd Parts Program and Web Based Utilities
7	Hands-on PC Build #1 AMD	17	Portable Computing
8	Operating Systems: Troubleshooting & Optimization	18	Technology Design
9	Hands-on PC Build #2 Intel	19	Hardware Assembly, Debug, and Troubleshooting
10	Hands-on PC Build #2 Intel	20	A+ Certification Practice

Core Instructional & Supplemental Materials including various levels of Texts
CompTIA A+ Certification All-in-One Exam Guide, Ninth Edition (Exams 220-901 & 220-902) by Mike Myers CompTIA official site https://certification.comptia.org/ Professor Messer full video training course for A+ certification

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https://www.youtube.com/user/professormesser Code.org Youtube.com NJ Diversity, Equity, and Inclusion Educational Resources* *NJ Diversity, Equity, and Inclusion/NJ LGBT and Persons with Disabilities Education appears in the “PC Pitfalls and Place in History” unit

Time Frame	1 Week (5 blocks)
Topic	
Path of the PC Technician	
Alignment to Standards	
9.4.12.CI.2: Identify career pathways that highlight personal talents, skills and abilities. 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities and utility for accomplishing a specified task 9.2.12.CAP.5: Assess and modify a personal plan to support current interests and postsecondary plans.: 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● What are the various paths to becoming a PC Technician? ● What are the benefits of becoming a PC Technician? ● What are the proper tools/requirements needed for the PC Technician? ● How does the PC Technician stay safe and keep others from general harm? SWBAT demonstrate understanding of the following: ● The definition of a proper PC Technician and how a person becomes one. ● Basic safety/behavior protocols and the proper tools to diagnose, build and repair technology. Learning Activities: ● Exploration activity on the different jobs and positions available to the computer	

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literate.
- Match Up : Personal to Public. Defining what it is to be a professional tech in society.
- Hands-on understanding of the different tool kits need to perform the various tasks ahead.
- An overview of safety and the hazards/pitfalls of working with electronics.
- Comprehensive survey to assess skill set and determines aptitude and potential placement.
- Behavior and Dress Matching Activity and Role Play.
- Group Project on unsafe work habits with a discovery exercise on how to avoid potential problems.
- General exercise on safety setup with electric devices.

Assessments

Formative:
- Engaging anticipatory set
- Classwork/Daily Activity and Homework
- Teacher Observation
- Exit Ticket/Reflection

Summative:
- Project/Group progress assessment
- Quizzes and Tests

Alternative:
- Kahoot
- Poll Everywhere
- Quizlet
- Roll Play Activities

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.ST.3: Describe and follow safety, health and environmental standards related to science, technology, engineering and mathematics (STEM) workplaces.
CTE.9.3.ST.4: Understand the nature and scope of the Science, Technology, Engineering & Mathematics Career Cluster and the role of STEM in society and the economy.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize

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information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Career Education
CRP2: Apply appropriate academic and technical skills. CRP4: Communicate clearly and effectively with reason. CRP10: Plan education and career paths aligned to personal goals.

Time Frame	2 Weeks (10 blocks)
Topic	
Visible PC, Networks, Windows, Mac, and Linux Operating Systems	
Alignment to Standards	
8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 8.2.12.ED.4: Design a product or system that addresses a global problem and document	

decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.

Learning Objectives and Activities

SWBAT answer the following questions:
- How does the PC work?
- What is a network?
- What is an operating system?

SWBAT demonstrate understanding of the following:
- A basic overview of the personal computer and all of its components. How these parts interact and their uses.
- The basic concept of a network and how the modern PC uses it.
- A basic overview on the software that runs the PC.
- The three major operating systems, similarities and differences.

Learning Activities:
- Investigative/dissection project on how the PC works. A computer is a collection of components and their interactivity.
- Discovery lesson on operating systems and the Bios and how they are the software that brings the hardware to life.
- Discovery lesson on how a network is a way to connect and share information between computers.
- Lecture and discussion and Group Project to layout and define all the components in a common household pc.
- Hands-on look at how we create/install/configure the system bios.
- Individual research project on the three major operating systems to determine cost and specifications required(compare/contrast).
- Lecture and discussion to define the three operating systems and their specific specialty.

Assessments

Formative:
- Daily anticipatory set to explain each piece of computer hardware.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Exit Ticket/Reflection

Summative:
- Project/Group Project progress assessment
- Quizzes and Tests
- Working/Functioning PC project component(bootable os usb drive)

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Alternative:
- Chase the card: Group Hardware ID Game
- Virtual PC Simulator on Steam

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.ST-ET.2: Display and communicate STEM information.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.
- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Career Education

CRP4: Communicate clearly and effectively with reason.

Time Frame	2 Weeks (10 blocks)

Topic

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Inside the PC: Processors, Ram, Motherboards, Power Supplies, Hard Drives, Cards, and Cables

Alignment to Standards

9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.
8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs.
8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
8.2.12.NT.2: Redesign an existing product to improve form or function.
8.2.12.ETW.4: Research historical tensions between environmental and economic considerations as driven by human needs and wants in the development of a technological product and present the competing viewpoints.

Learning Objectives and Activities

SWBAT answer the following questions:

- What are the best parts needed to construct and build a modern personal computer?
- How do I shop and build a computer virtually?
- What is the order of operations for pc construction?
- How do I know I put my pc together correctly?

SWBAT demonstrate understanding of the following:

- The ability to identify and define a modern computer part.
- The ability to configure/shop/build a pc virtually.
- The knowledge of pc construction and the proper path to creating a working home computer

Learning Activities:

- Individual PC Part Picker Activity to identify and see the relation between Processors, Ram, Motherboards, Power Supplies, Hard Drives, Cards, and Cables are the basic components that make up a modern pc.
- Use Virtual PC Simulator as a class to see if components picked work together in a real world scenario..
- Specifications/benchmarks of hardware components are a road map to proper assembly. Individual will do research and report their findings to determine if we have the best components.
- Board game operation style of identification of pc components and parts.
- Visual overview of all connectors and how to identify their power connection and proper placement. This is reenforced by the in & out game.
- Basic electronic seminar on sizing up the amount of power needed to run all

components.
- Lecture and discussion on the various types of PC's available and their different needs.
- Matching exercise to determine different specifications of different components.

Assessments

Formative:
- Opening story on typical technical specification truths.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Exit examples of amazing builds of all types varying day to day.

Summative:
- Individual PC Part Picker Build
- Benchmark Defend Group Build Assessment
- Quizzes and Tests

Alternative:
- Visual Lineup exercise for reluctant learners.
- Specification report for non-group participants.
- Advanced hardware exercise

Interdisciplinary Connections

Cs&DT: 8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.

Career Readiness, Life Literacies, and Key Skills

9.3.ST.6: Demonstrate technical skills needed in a chosen STEM field.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or

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virtual worlds to analyze and propose a resolution to a real-world problem. This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Career Education
CRP4: Communicate clearly and effectively with reason.

Time Frame	2 Weeks (10 blocks)
Topic	
Build #1 - Barebones	
Alignment to Standards	
9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions. 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena." 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. 8.1.12.CS.3: Compare the functions of application software, system software, and hardware.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● What make this PC different from other builds? ● Can I assemble these parts into a working computer?	

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- Could I shop/build this computer on my own?

SWBAT demonstrate understanding of the following:
- The ability to build a basic system.(AMD, Platter HD, No Extras)
- The knowledge to identify, shop, and build a duplicate system.

Learning Activities:
- Classwide round-robin part selection process. The most knowledgeable get the best parts.
- Group activity on setting up a test bench with their new parts.
- Aware POST is the self startup test that lets you know that the computer is assembled correctly.
- Groups will assemble their first pc in a case.
- Groups will attach input and output devices.
- Groups will install operating system.
- Groups will split up tasks of The Build Report into different jobs and recreate the build they have completed in PC Part Picker, identify upgrade path, fand provide examples of a common pitfall they encountered.
- Classwide feedback discussion to reveal all of the common truths that we encountered in this hands-on project.

Assessments

Formative:
- 5 Minute Q&A class discussion to set pacing and un-stick students.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Reflection/Report(helps you get started and stay on task on a lengthy project)

Summative:
- Completed test build
- Completed, Updated and Working PC
- Completed Build Report

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.ST-ET.1: Use STEM concepts and processes to solve problems involving design and/or production.
CTE.9.3.ST-ET.2: Display and communicate STEM information.

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Technology Integration
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge. • 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem. Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge. • 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem. This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage. • 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
Career Education
CRP2: Apply appropriate academic and technical skills. CRP4: Communicate clearly and effectively with reason. CRP10: Plan education and career paths aligned to personal goals.

Time Frame	1 Week (5 blocks)
Topic	
Operating Systems: Troubleshooting & Optimization	
Alignment to Standards	
9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and	

problem solving.
8.1.12.CS.2: Model interactions between application software, system software, and hardware.
8.1.12.CS.3: Compare the functions of application software, system software, and hardware.
8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources.

Learning Objectives and Activities

SWBAT answer the following questions:
- What is software and what are operating systems?
- Which operating system do I install?
- How do I install an operating system?
- What do I do when things don't work?

SWBAT demonstrate understanding of the following:
- There is a proper way to install/update/dual boot an operating system.
- Limited booting of an operating system for debug purposes.
- You can debug/tweak to turn a non-working OS into a fully functioning OS.

Learning Activities:
- Students will discover that software is code that makes the hardware work the way the user wants by installing an alternate of their choice.
- By group discovery the students will realize that there are many different OS's and they have different hardware requirements by installing the same OS on their 2 completed builds.
- Lecture, apply and discussion on optimal settings for most computers in Windows 10.
- In a group project students will change settings on a rival groups computer. In competition they must restore and optimize their system.
- An overview of software and the code used to create it.
- Lecture and discussion on the history of operating systems, their evolution, differences, and similarities.
- Individual internet research on OS's, their cost and hardware specifications.

Assessments

Formative:
- Classwork/Daily Activity and Homework.
- Teacher Observation of hands-on progress.
- Exit examples of different operating systems varying from day to day.

Summative:

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- Project Completion
- Research paper
- Quizzes and Tests

Alternative:

- Extended research paper available

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.IT.12: Demonstrate knowledge of the hardware components associated with information systems.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.

- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Career Education

CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

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Time Frame	2 Weeks (10 blocks)

Topic

Build #2 - Intel Experience

Alignment to Standards

9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.
9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions.
8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.
9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural).
9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice.
8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.
8.1.12.CS.3: Compare the functions of application software, system software, and hardware.

Learning Objectives and Activities

SWBAT answer the following questions:
- What make this PC different from other builds?
- Can I assemble these parts into a working computer?
- Could I shop/build this computer on my own?

SWBAT demonstrate understanding of the following:
- The ability to build a basic system.(Intel, SSD, Graphics Cards)
- The knowledge to identify, shop, and build a duplicate system.

Learning Activities:
- Classwide round-robin part selection process. The most knowledgeable get the best parts.
- Group activity on setting up a test bench with their new parts.
- Aware POST is the self startup test that lets you know that the computer is assembled correctly.
- Groups will assemble their second pc in a case.
- Groups will attach input and output devices.
- Groups will install operating system(of their choice).
- Groups will split up tasks of The Build Report into different jobs and recreate the build

they have completed in PC Part Picker, identify upgrade path, fand provide examples of a common pitfall they encountered.
- Classwide feedback discussion to reveal all of the common truths that we encountered in this hands-on project.

Assessments

Formative:
- 5 Minute Q&A class discussion to set pacing and un-stick students.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Reflection/Report(helps you get started and stay on task on a lengthy project)

Summative:
- Completed test build
- Completed, updated and working PC
- Completed Build Report

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.ST-ET.1: Use STEM concepts and processes to solve problems involving design and/or production.
CTE.9.3.ST-ET.2: Display and communicate STEM information

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows:

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motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage. ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
Career Education
CRP2: Apply appropriate academic and technical skills. CRP4: Communicate clearly and effectively with reason. CRP10: Plan education and career paths aligned to personal goals.

Time Frame	1 Week (5 blocks)
Topic	
Networking, Browsers, and Security	
Alignment to Standards	
9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem. 8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs. 8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics. 9.4.12.DC.4: Explain the privacy concerns related to the collection of data (e.g. cookies) and generation of data through automated processes that may not be evident to users	
Learning Objectives and Activities	
SWBAT answer the following questions: ● What is networking and how is achieved? ● What is the internet and how does it function? ● What is a browser and how does it function? ● How do I protect my privacy while online? SWBAT demonstrate understanding of the following: ● A network is a collection of computers connected by a wiring system. ● The internet is the largest network with rules for sharing information.	

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- A browser is a window to help navigate and make sense out of the internet's addressing system
- Security for PCs are constantly changing and evolving.
- There are no permanent fixes or iron clad fixes for security breaches.
- A few basic concepts and rules can give the average user a mostly secure system.

Learning Activities:
- The students as a group will set up a personal computer networked to another personal computer.] and exchange information.
- Through lecture and example the students will have the ability to identify the necessary components and set up to achieve networking.
- Through basic research the students will individually have a basic idea of what the internet, ip addresses, and a dns server are and how to use them. Reenforced by classwide discussion.
- The ability to select, configure, and install a browser, plug-ins, and extensions.
- Lecture and discussion to define networking, the internet and browsers.
- Hands-on group activity to set up a basic hardwired and wireless network and connection to the internet.
- Hands-on group activity to choose and install/configure a browser. (Internet Explorer, Firefox, Google Chrome, etc...)
- The students will be able to identify and eliminate viruses, malware and unauthorized access. Through trial and error using numerous applications.
- Small Group discussion many uses of a firewall , VPN and port protection. Should result in each groups definition and example of topic.
- Individual Research/Reflection on future of network security and their problems.
- Lecture and discuss the various aspects/theories for home network/pc security. Basic concepts in hacking and online defenses.

Assessments

Formative:
- Anticipatory set on basic network information.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Exit Ticket/Reflection

Summative:
- Project/Group progress assessment
- Visual quiz on setting up a wired/wireless network between two pcs and on installing and configuring one of the three common browsers.

Alternative:
- Create your own Kahoot for research topics.

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Interdisciplinary Connections
ELA: WHST.9-10.1.B: Develop claim(s) and counterclaims using sound reasoning, supplying data and evidence for each while pointing out the strengths and limitations of both claim(s) and counterclaims in a discipline-appropriate form and in a manner that anticipates the audience's knowledge level and concerns. With regard to the research and reflection.
Career Readiness, Life Literacies, and Key Skills
CTE.9.3.ST-ET.2: Display and communicate STEM information.
Technology Integration
All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge. ● 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem. Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge. ● 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem. This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage. ● 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.
Career Education
CRP4: Communicate clearly and effectively with reason.

Time Frame	2 Weeks (10 blocks)
Topic	

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Build #3 - State of the Art
Alignment to Standards
9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions. 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. 8.1.12.CS.3: Compare the functions of application software, system software, and hardware.
Learning Objectives and Activities
SWBAT answer the following questions: • What make this PC different from other builds? • Can I assemble these parts into a working computer? • Could I shop/build this computer on my own? SWBAT demonstrate understanding of the following: • The ability to build a basic system.(Multi-core Intel, M.2 SSD, Graphics Card, Increased RAM) • The knowledge to identify, shop, and build a duplicate system. Learning Activities: • Classwide round-robin part selection process. The most knowledgeable get the best parts. • Group activity on setting up a test bench with their new parts. • Aware POST is the self startup test that lets you know that the computer is assembled correctly. • Groups will assemble their third pc in a case. • Groups will attach input and output devices. • Groups will install operating system. • Groups will split up tasks of The Build Report into different jobs and recreate the build they have completed in PC Part Picker, identify upgrade path, fand provide examples of a common pitfall they encountered. • Classwide feedback discussion to reveal all of the common truths that we encountered

in this hands-on project.

Assessments

Formative:
- 5 Minute Q&A class discussion to set pacing and un-stick students.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Reflection/Report(helps you get started and stay on task on a lengthy project)

Summative:
- Completed test build
- Completed, Updated and Working PC
- Completed Build Report

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.ST-ET.1: Use STEM concepts and processes to solve problems involving design and/or production.
CTE.9.3.ST-ET.2: Display and communicate STEM information.

Technology Integration

All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaboratively and to create and communicate knowledge.
- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.
- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.
- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve

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problems.
Career Education
CRP2 : Apply appropriate academic and technical skills. CRP4 : Communicate clearly and effectively with reason. CRP10: Plan education and career paths aligned to personal goals.

Time Frame	1 Week (5 blocks)
Topic	
Monitors, Keyboards, & Mice	
Alignment to Standards	
8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs. 8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs. 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● What is meant by input and output? ● What are the common input/output devices? ● What are the differences between various types of keyboards and mice? ● What do the specifications do I need for certain monitor applications? ● What is the best Monitor/TV for me? SWBAT demonstrate understanding of the following: ● Input devices allow the user to share information with the computer. ● Output devices allow the computer to share information with the user.	

- Keyboards, Mice, and Monitors are all products of their applications.
- Correct high/mid/low video/gaming setups.
- Proper video source sizing for home use.

Learning Activities:

- Identification of what external equipment is an input/output device by visual line-up matching game.
- Lecture, define, and discuss how to use the common input and output devices.
- Hands on group installation of the common devices on all three major operating systems.
- Research and report on their dream monitor keyboard and mouse setup.
- Guided navigation through Rtings.com website and other benchmarking sites while defining the various categories in which our devices lie.
- Full live demonstration of the various specifications that make up a monitor.
- Individual shopping activity to buy a certain monitor for a certain situation(grandma, gaming, workplace, etc…).

Assessments

Formative:

- Daily anticipatory set to explain each slight difference in monitor, keyboard or mouse.
- Classwork/Daily Activity and Homework
- Teacher Observation
- Exit Ticket/Reflection

Summative:

- Project/Group Project progress assessment
- Quizzes and Tests
- Report on dream monitor, keyboard, and mouse
- Assessment on specific monitor for use

Alternative:

- Video advertising project

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.ST-ET.2: Display and communicate STEM information.

Technology Integration

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- 9.4.8.TL.6: Collaborate to develop and publish work that provides perspectives on a real-world problem.

Additional resources and extension activities will be posted on Google Classroom in order to encourage students to reflect on their learning and expand on their knowledge.

- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.

- 9.4.5.CT.3: Describe how digital tools and technology may be used to solve problems.

Career Education
CRP4: Communicate clearly and effectively with reason.

Time Frame	1 Week (5 blocks)
Topic	
PC Pitfalls and Place in History	
Alignment to Standards	
9.4.12.CI.2: Identify career pathways that highlight personal talents, skills and abilities. 9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities and utility for accomplishing a specified task 9.2.12.CAP.5: Assess and modify a personal plan to support current interests and postsecondary plans.: 9.4.12.IML.4: Assess and critique the appropriateness and impact of existing data visualizations for an intended audience. 8.2.12.ITH.2: Propose an innovation to meet future demands supported by an analysis of the potential costs, benefits, trade-offs and risks, related to the use of the innovation. 8.2.12.ETW.4: Research historical tensions between environmental and economic	

considerations as driven by human needs and wants in the development of a technological product and present the competing viewpoints.

Learning Objectives and Activities

SWBAT answer the following questions:
- What is the history of the PC?
- Who are the people responsible in the past/present/future for its development?
- How to recognize trends in PC usage, formfactor, and application?
- What is the downfall or inherent problems with PCs as we know it?

SWBAT demonstrate understanding of the following:
- The PC is a combined effort of mankind to solve problems, answer questions and automate tasks.
- The people who pioneered PCs were special and can come from any background.
- What are modern trends and the direction modern computing is heading.
- What are modern threats and where we don't want computing to go.

Learning Activities:
- Living lecture and discussion on the timeline that makes up our modern PC history.*
- Individual scavenger hunt to find and take pictures of 4 different form factors of a PC.
- Short opinion paper on where they think the world is heading(regarding PC Hardware) in the next 25 years.
- Partner research and presentation on a famous person in technology.*
- Lecture and discussion on the negative impact of science and technology.

Assessments

Formative:
- Minute quick example of good or bad tech.(flashcard style)
- Classwork/Daily Activity and Homework
- Teacher Observation

Summative:
- Presentation on Famous Person in Tech
- Quick Quizzes
- Completed Opinion Piece

Alternative:
- Junk Build for extremely advanced students.

Interdisciplinary Connections

ELA: WHST.9-10.7: Conduct short as well as more sustained research projects to

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answer a question (including a self-generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation.

Career Readiness, Life Literacies, and Key Skills

Technology Integration
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Career Education
CRP4: Communicate clearly and effectively with reason.

Time Frame	1 Week (5 blocks)
Topic	
3rd Party Programs and Web Based Utilities	
Alignment to Standards	

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8.1.12.AP.9: Collaboratively document and present design decisions in the development of complex programs.
8.1.12.AP.6: Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs.
9.4.12.DC.6: Select information to post online that positively impacts personal image and future college and career opportunities.
9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities and utility for accomplishing a specified task
8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Objectives and Activities

SWBAT answer the following questions:
- Why do I have this computer and what needs can it serve?
- What is meant by third party?

SWBAT demonstrate understanding of the following:
- An understanding of all of the various uses of the modern computer and its programs in our society.

Learning Activities:
- The student will be able to assess the need of a user and apply the correct software solution through role play.
- Hands-on individual installation of computer software of various types.
- Students will learn how to watch software specifications to hardware specifications so it runs properly through “Can I Run It?”
- Installing/Identifying the correct system software to run web based utilities by understand the task manager and system specifications.
- Lecture and discuss all of the possible uses for a personal computer.
- Internet research assignment to identify the proper software tools for a productive part of private industry.
- Hands-on installation techniques.
- Hands-on activity to determine the components needed to run web based apps.

Assessments

Formative:
- Visual inspection of program installations
- Review based question game to illustrate different people and their program uses
- Dismissal quick questions

Summative:
- Quizzes and Tests

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• Role Play Activity • Research report
Interdisciplinary Connections
Career Readiness, Life Literacies, and Key Skills
CTE.9.3.ST-ET.2: Display and communicate STEM information.
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Career Education

Time Frame	1 Week (5 blocks)
Topic	
Portable Computing	

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Alignment to Standards
9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.IML.3: Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions. 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. 9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 8.2.12.NT.2: Redesign an existing product to improve form or function.

Learning Objectives and Activities

SWBAT answer the following questions:

- What makes a computer portable?
- Can I build/upgrade my own portable computer?
- Is the hardware layout in a portable computer different from my desktop?
- What are the different types of manufactured portable computers?
- How do I enhance performance and extend battery life in a portable situation?

SWBAT demonstrate understanding of the following:

- A computer with a battery backup is considered portable.
- There are four types of manufactured portable computers: Laptops, Netbooks, Ultrabooks and Tablets.
- Home construction of a manufactured portable computer is difficult but maintenance and upgrades are possible.
- Hardware layout of a portable computer sacrifices performance for space and power needs

Learning Activities:

- Students will be able to define and understand a portable computer by playing a hands on trial and error matching game.
- As pairs, students will maintain, manage, and upgrade a portable device.
- Students will gain the ability to identify the right portable computer for the correct need by research, reviews and benchmark sites.(also connecting prior knowledge)
- Lecture and discuss the various types of portable computers to define, compare and contrast its hardware layout.
- Hands-on activity to diagnose portable computer specific problems.
- Guided examples on how to change settings to enhance performance and increases

battery life.
- Hands-on activity to plan and achieve an upgrade on certain components of portable computers.

Assessments

Formative:
- Daily runway of Laptops currently for sale with quick discussion
- Dissection and Upgrade project progress check-in
- Clean-up questions

Summative:
- Project/Group completion assessment
- Reports & Quizzes

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CTE.9.3.IT.12: Demonstrate knowledge of the hardware components associated with information systems.

Technology Integration

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- 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem.

This entire unit deals with hardware identification and the creation of an operating system. The technology that will be integrated will be a hardware specific deconstruction of a personal computer. The specific hardware is as follows: motherboard, memory, storage, power supply, processors, cases, graphics cards, and flash storage.
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DEPARTMENT: Mathematics COURSE: PC Hardware

Career Education
CRP7: Employ valid and reliable research strategies. CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

Time Frame	1 Week (5 blocks)
Topic	
Technology Design	
Alignment to Standards	
9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice. 8.2.12.ED.4: Design a product or system that addresses a global problem and document decisions made based on research, constraints, trade-offs, and aesthetic and ethical considerations and share this information with an appropriate audience.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● How do I assess the technology needs of a person? ● Where do I go to do research on the various types of PC components and software? ● How do I write up a paper budget and draft of a model PC? ● How do I properly communicate instructions/directions? SWBAT demonstrate understanding of the following: ● The understanding of what the appropriate technology is for the need. ● How to locate the appropriate parts and set up an outline for construction with budget. ● The ability to communicate directions/instructions to another person. Learning Activities: ● The correct use of interviewing techniques to form the right questions to set up a definition of a person's technology needs. ● The ability to do internet research and find all the components needed to construct a working pc.	

- The ability to set up a budget and a basic outline of need resources.
- Classroom survey project that helps us determine the correct questions to get to the bottom of an individual's technology needs.
- Internet research project on 3rd party vendors sites to create a listed budget of materials to fill that need.
- Classroom presentation to teach a simple lesson to the class.

Assessments

Formative:
- Daily demographic profile to do a technology referral exercise daily
- Classwork/Daily Activity and Homework
- Teacher Observation
- What is wrong with this scenario? question on the way out.

Summative:
- Completed Budget and Buy List
- Quizzes
- Teach Me presentation

Alternative:
- Teach Me research paper
- Roll Play Sheets

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

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Career Education
CRP4: Communicate clearly and effectively with reason.

Time Frame	1 Week (5 blocks)
Topic	
Hardware Assembly, Debug, and Troubleshooting	
Alignment to Standards	
8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices. 8.1.12.IC.3: Predict the potential impacts and implications of emerging technologies on larger social, economic, and political structures, using evidence from credible sources. 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis. 8.2.12.ETW.1: Evaluate ethical considerations regarding the sustainability of environmental resources that are used for the design, creation and maintenance of a chosen product.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● Can I take computer parts and make a working pc? ● Can I fix an unknown problem in a PC? ● Could I become a PC Technician professionally? SWBAT demonstrate understanding of the following: ● The understanding of the deeper functions/relationships between computer parts. ● An instinctive grasp over common problems/solutions to PC problems. ● The ability to communicate/diagnose a problem to then formulae a repair plan.	

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- An idea of what you do in an unsolvable situation.

Learning Activities:
- A comprehensive test of the skills acquired throughout the course. Done through the Sabotage exercise.
- The ability to demonstrate mastery over the PC is displayed in the Basic Skill Debug exercise.
- The students will get some real world experience with roll play customers with real computer problems that have to be estimated, planned and solved the way it is outside the classroom.(Best Buy Simulator)

Assessments

Formative:
- Project progress check-in
- Teacher Observation
- Roll Play step-by-step feedback

Summative:
- Sabotage Exercise
- Basic Skill Debug Exercise
- Completed Roll Play to Repair Project

Alternative:
- Make a PC Hardware Final Kahoot
- Final Dream PC Part Picker Build

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

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Career Education
CRP11: Use technology to enhance productivity.

Time Frame	1 Week (5 blocks)
Topic	
A+ Certification Practice	
Alignment to Standards	
9.4.12.CT.3: Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why solutions may work better than others (e.g., political. economic, cultural). 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice.	
Learning Objectives and Activities	
SWBAT answer the following questions: ● What is A+ certification and why is it necessary? ● How do I become A+ certified? SWBAT demonstrate understanding of the following: ● The understanding of what is it to be hardware certified. ● Knowledge of what is on the A+ certification test. ● How a person prepares and signs up for the A+ examination.	

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Learning Activities:

- The student will understand the set list of topics that are covered by the A+ certification assessment from online research and web based resources.
- Students will take all known sources of data and comprise a study strategy.
- Lecture and discuss what the A+ exam is and why it is needed in society.
- A review session on the important material that will be assessed by the exam.
- Students will play a hands-on game that tests their knowledge of modern technology.
- Students will take the A+ practice exam to gauge preparedness for the real thing.

Assessments

Formative:
- Daily growing list of A+ sources
- Classwork/Daily Activity and Homework
- Teacher Observation
- 5 minute discussion daily on sticky questions from research/practice

Summative:
- Written research/study strategy for A+ exam
- A+ certification practice test 1
- A+ certification practice test 2

Benchmark:
- Cumulative Course Benchmark

Alternative:
- Basic course study guide
- Cumulative Course Benchmark

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

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Career Education
CRP7: Employ valid and reliable research strategies. CRP10: Plan education and career paths aligned to personal goals.

Modifications (ELL, Special Education, At Risk Students, Gifted & Talented, & 504 Plans)
ELL: ● Work toward longer passages as skills in English increase ● Use visuals ● Introduce key vocabulary before lesson ● Teacher models reading aloud daily ● Provide peer tutoring ● Use of Bilingual Dictionary ● Guided notes and/or scaffold outline for written assignments ● Provide students with English Learner leveled readers. ***Supports for Students With IEPs***: ● Allow extra time to complete assignments or tests ● Guided notes and/or scaffold outline for written assignments ● Work in a small group ● Allow answers to be given orally or dictated ● Use large print books, Braille, or books on CD (digital text) ● Follow all IEP modifications

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At-Risk Students:

- Guided notes and/or scaffold outline for written assignments
- Introduce key vocabulary before lesson
- Work in a small group
- Lesson taught again using a differentiated approach
- Allow answers to be given orally or dictated
- Use visuals / Anchor Charts
- Leveled texts according to ability

Gifted and Talented:

- Create an enhanced set of introductory activities (e.g. advance organizers, concept maps, concept puzzles)
- Provide options, alternatives and choices to differentiate and broaden the curriculum
- Organize and offer flexible small group learning activities
- Provide whole group enrichment explorations
- Teach cognitive and methodological skills
- Use center, stations, or contracts
- Organize integrated problem-solving simulations
- Propose interest-based extension activities
- Expose students to beyond level texts.

Supports for Students With 504 Plans:

- Follow all the 504 plan modifications
- Text to speech/audio recorded selections
- Amplification system as needed
- Leveled texts according to ability
- Fine motor skill stations embedded in rotation as needed
- Modified or constrained spelling word lists
- Provide anchor charts with high frequency words and phonemic patterns