DEPARTMENT: Applied Technology COURSE: Introduction to Cybersecurity and AI

Curriculum Development Timeline

School: **Ocean Township High School**

Course: **Introduction to Cybersecurity and AI**

Department: **Applied Technology**

Board Approval	Supervisor	Notes
October 2024	Erin Leahy	Born Date

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Township of Ocean Pacing Guide			
Week	**Marking Period 1**	**Week**	**Marking Period 3**
1	Intro to Cybersecurity	11	PC Hardware: Inside the PC
2	Intro to Cybersecurity	12	PC Hardware: Build
3	Digital Citizenship & Cyber Hygiene	13	PC Hardware: Build
4	Digital Citizenship & Cyber Hygiene	14	Data Security
5	Cryptography	15	Data Security
Week	**Marking Period 2**	**Week**	**Marking Period 4**
6	Cryptography	16	Artificial Intelligence
7	System Administration & IT Concepts	17	Artificial Intelligence
8	System Administration & IT Concepts	18	Artificial Intelligence
9	System Administration & IT Concepts	19	Artificial Intelligence
10	System Administration & IT Concepts	20	Cyber & AI Capstone Project

Core Instructional & Supplemental Materials including various levels of Texts
CodeHS: Fundamentals of Cybersecurity CodeHS: Intro to AI for High School Code.org TryHackMe.com CompTIA official site https://www.comptia.org/certifications Professor Messer's full video training course for N+ certification https://www.youtube.com/user/professormesser Youtube.com Google Applied Digital Skills NJ Diversity, Equity & Inclusion Educational Resources

Home of the Spartans!
#spartanlegacy

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Time Frame	2 weeks
Topic	
Intro to Cybersecurity	
Alignment to Standards	
8.1.12.NI.2: Evaluate security measures to address various common security threats. 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented. 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use. 8.1.12.AP.5: Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects 8.2.12.ITH.1: Analyze a product to determine the impact that economic, political, social, and/or cultural factors have had on its design, including its design constraints. CSTA 2-IC-20 Compare tradeoffs associated with computing technologies that affect people's everyday activities and career options. CSTA 2-IC-23 Describe tradeoffs between allowing information to be public and keeping information private and secure. CSTA 2-NI-05 Explain how physical and digital security measures protect electronic information. CSTA 3A-IC-24 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices. CSTA 3A-IC-29 Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users. CTA 3A-IC-30 Evaluate the social and economic implications of privacy in the context of safety, law, or ethics. CSTA 3A-NI-05 Give examples to illustrate how sensitive data can be affected by malware and other attacks. CSTA 3A-NI-06 Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts CSTA 3B-IC-25 Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society. CTSA 3B-IC-26 Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society. CSTA 3B-IC-27 Predict how computational innovations that have revolutionized aspects of our culture might evolve. CSTA 3B-NI-04 Compare ways software developers protect devices and information from unauthorized access.	

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Learning Objectives and Activities

SWBAT answers the following questions:

- What is Cybersecurity and why is it important?
- In what ways is the internet used?
- What information is at risk?
- How do we prevent cyber attacks? What are their impacts?
- What are the different CS career fields?
- What is the CIA Triad?
- What are “secure” systems?
- What do confidentiality, integrity, and availability mean in cybersecurity?

SWBAT demonstrates an understanding of the following:

- Different ways the Internet is used
- The steps to take to protect yourself on the Internet
- Cybersecurity and IoT
- CIA triad and how it relates to cybersecurity
- Identify which part of the CIA triad has been broken in a given scenario
- Recent cyber attacks and most historical/known events
- The impact of cyber attacks
- Cybersecurity workforce and what career opportunities are in the field

Learning Activities:

- CodeHS Lessons & Activities
- Researching and learning about the different ways to protect yourself on the internet
- Reviewing different websites' privacy settings
- Research recent cyber attacks
- Explore a threat map to see where cyber attacks are coming from and which countries are being targeted
- Research the financial impact of a cyber attack
- A general understanding of what information cyber criminals steal and what they do with the stolen information
- General exercise on the CIA Triad

Assessments

Formative:

- Discussion & Research
- Classwork
- Homework
- CodeHS Activities
- Teacher Observation
- Peer to peer discussion

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Summative:

- Project/Group progress assessment
- Quizzes & Tests

Benchmark:

- Pre-Assessment for CyberSecurity, AI & PC Hardware

Alternative:

- Kahoot
- Quizizz
- Class Discussion

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

9.2.12.CAP.6: Identify transferable skills in career choices and design alternative career plans based on those skills.
9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.
9.2.12.CAP.8: Determine job entrance criteria (e.g., education credentials, math/writing/reading comprehension tests, drug tests) used by employers in various industry sectors.
9.4.12.CI.2: Identify career pathways that highlight personal talents, skills, and abilities (e.g., 1.4.12prof.CR2b, 2.2.12.LF.8).

CompTIA ITF 2.6 Compare and contrast common computing devices and their purposes.

CYBER ORG 9-12.CS.IOT Analyze the vulnerabilities of Internet of Things devices. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of IoT devices and the vulnerabilities associated with the connection and use of those devices.
CYBER ORG 9-12.DC.PPI.2 Explain the individual risks of a data breach to an organization housing personal data. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of understanding that if an organization gets hacked, it can still harm the individual whose data was stolen.
CYBER ORG 9-12.SEC.CIA Explain various interactions between the CIA Triad and the three states of data. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of interactions and how people, processes, and technology support those interactions. In addition, the three states of data

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refer to “data in use” (currently being accessed), “data at rest” (waiting to be accessed), and “data in motion” (moving from one location to another)

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.

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.

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

Topic

Digital Citizenship & Cyber Hygiene

Alignment to Standards

8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use.
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.EC.1 Analyze controversial technological issues and determine the degree to which individuals, businesses, and governments have an ethical role in decisions that are made.

CSTA 2-IC-20 Compare tradeoffs associated with computing technologies that affect people's everyday activities and career options.
CSTA-2-IC-21 Discuss issues of bias and accessibility in the design of existing technologies
CSTA 2-IC-23 Describe tradeoffs between allowing information to be public and keeping information private and secure.
CSTA 2-NI-05 explain how physical and digital security measures protect electronic information
CSTA 3A-DA-10 Evaluate the tradeoffs in how data elements are organized and where data is stored.
CSTA 3A-AP-20 Evaluate licenses that limit or restrict use of computational artifacts when

using resources such as libraries.
CSTA 3A-IC-24 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
CSTA 3A-IC-25 Test and refine computational artifacts to reduce bias and equity deficits.
CSTA 3A-IC-29 Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users.
CTA 3A-IC-30 Evaluate the social and economic implications of privacy in the context of safety, law, or ethics.
CSTA 3A-NI-05 Give examples to illustrate how sensitive data can be affected by malware and other attacks.
CSTA 3A-NI-06 Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts
CSAT 3A-NI-08 Explain tradeoffs when selecting and implementing cybersecurity recommendations.
CSTA 3B-NI-04 Compare ways software developers protect devices and information from unauthorized access.
CSTA 3B-IC-28 Debate laws and regulations that impact the development and use of software.

Learning Objectives and Activities

SWBAT answers the following questions:

- What is a digital footprint?
- What does it mean that the internet is public and permanent?
- What are some recommended social media guidelines?
- How can you maintain your digital footprint?
- What is cyberbullying?
- What are ways to stay safe online?
- What are some online safety guidelines?
- What are data privacy and security?
- What to do if your data is stolen?
- What is information literacy?
- What are some techniques for judging source legitimacy and identifying information
- What is a copyright?
- What are hackers?
- What are the consequences of hacking?

SWBAT demonstrate understanding of the following:

- Their digital footprint and how to showcase themselves online
- How to maintain their digital footprint
- Understand how their online activity contributes to a permanent and public digital footprint
- Cyberbullying and its impact

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- Identify proper actions if impacted by cyberbullying
- Internet safety
- Data privacy and security
- Use best practices in personal privacy and security
- Effectively search for a evaluate resources
- Source legitimacy
- Copyright license
- Different types of hacking
- Explain career opportunities in cybersecurity

Learning Activities:

- Complete a comprehensive digital footprint
- Explore various social media guidelines
- Explore and discuss cyberbullying scenarios
- Explore Internet safety scenarios
- Explore Google's privacy policy
- Create and test search queries
- Explore the evidence for using sources
- Create citations for sources
- Explore image search tools
- Explore what penetration testing is
- Sign an ethical hacker agreement
- Project PSA

Assessments

Formative:

- Discussion & Research
- Classwork
- CodeHS Activities
- Teacher Observation

Summative:

- Project/Group progress assessment
- Project PSA
- Quizzes & Tests

Alternative:

- Kahoot
- Quizizz
- Class Discussion

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Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

9.4.12.DC.1: Explain the beneficial and harmful effects that intellectual property laws can have on the creation and sharing of content (e.g., 6.1.12.CivicsPR.16.a).
9.4.12.DC.2: Compare and contrast international differences in copyright laws and ethics.
9.4.12.DC.3: Evaluate the social and economic implications of privacy in the context of safety, law, or ethics (e.g., 6.3.12.HistoryCA.1).
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 (e.g., 8.1.12.NI.3).
9.4.12.DC.6: Select information to post online that positively impacts personal image and future college and career opportunities.
9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information.
9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources (e.g., NJSLSA.W8, Social Studies Practice: Gathering and Evaluating Sources.

CompTIA ITF 1.4 Explain the value of data and information

CYBER ORG 9-12.DC.FOOT Examine the implications of both positive and negative digital footprints. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of ethical, societal, and financial implications.
CYBER ORG 9-12.DC.PPI.1 Explain the importance of social identity and the implications of online activity regarding private data, long-term career impacts, and the permanence of digital data. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of the possible impacts of data-sharing in such areas as college admissions, cancel culture, careers, and relationships.
CYBER ORG 9-12.DC.ETH Discuss the role that cyber ethics plays in current society. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of how integrity and reputation can be affected by actions that are taken online.
CYBER ORG 9-12.DC.CYBL Prepare a plan to raise awareness of the effects of cyberbullying. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of actions that can serve to reduce and/or prevent cyberbullying.
CYBER ORG 9-12.SEC.AUTH Evaluate authentication and authorization methods and the risks associated with failure. Clarification statement: At this level, student discussions should

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focus on previous standards as well as grade-appropriate examples of authentication and authorization methods, such as certificate, token based, two-factor, multifactor, and biometric. CYBER ORG 9-12.DC.THRT Analyze the motives of threat actors. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of motives of threat actors such as financial, political, ideological, or simple malice. This analysis may occur in a variety of forms, such as supplying a scenario or case study from current events
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. 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.
Career Education
CRP2: Apply appropriate academic and technical skills. CRP4: Communicate clearly and effectively with reason. CRP5: Consider the environmental, social and economic impact of decisions

Time Frame	2 weeks
Topic	
Cryptography	
Alignment to Standards	
8.1.12.CS.1: Describe ways in which integrated systems hide underlying implementation details to simplify user experiences. 8.1.12.NI.2: Evaluate security measures to address various common security threats. 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented. 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use. 8.1.12.DA.2: Describe the trade-offs in how and where data is organized and stored. 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms. 8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and accessible.	

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Learning Objectives and Activities

SWBAT answer the following questions:

- What is cryptography?
- Why do we need some secrecy in our transparent information age?
- What was The Enigma during WW2?
- What is modern cryptography and how has cryptography changed over time?
- What is 256-bit key encryption and how does this help cryptography overall?
- What is Symmetric Encryption?
- What is Asymmetric Encryption?
- What was The Enigma during WW2?
- What are authentication methods?
- What is a digital certificate?
- What is hashing?

SWBAT demonstrate understanding of the following:

- Knowledge of how cryptography is used
- Explain general encryption with data, keys
- Discuss various classical encryption techniques
- How modern cryptography has changed over time
- Basic ciphers (Caesar, Vigenere,..)
- Explain the concept of encryption and its role in secure communication
- Identify and compare different historical and modern encryption techniques
- Analyze the limitations of certain decryption methods
- Discuss the potential future applications of cryptography
- Define digital certificates and explain their role in web activity
- Explain the concept of hashing and its importance in data verification

Learning Activities:

- Video & Discussion on securing the cloud
- Passing notes in class (hands on encryption)
- Enigma Lab
- Telephone game (hands on messaging transfer)
- Modulo math activity sheet
- Caesar Cipher JavaScript via CodeHS
- Vigenere Cipher JavaScript via CodeHS

Assessments

Formative:

- Discussion & Research
- Classwork

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- CodeHS Activities
- Teacher Observation

Summative:

- Project/Group progress assessment
- Quizzes & Tests

Alternative:

- Kahoot
- Quizizz
- Class Discussion
- Pictorial Learning Summaries

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

CompTIA Security 6.1 Compare and contrast basic concepts of cryptography
CompTIA Security 6.4 Given a scenario, implement public key infrastructure
CompTIA ITF 6.2 Explain cryptography algorithms and their basic characterics
CompTIA ITF 6.6 Explain common uses of encryption

CSTA 2.NI.06 Apply multiple methods of encryption to model the secure transmission of information.

CYBER ORG 9-12.SEC.AUTH Evaluate authentication and authorization methods and the risks associated with failure. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of authentication and authorization methods, such as certificate, token based, two-factor, multifactor, and biometric.

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.

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Career Education
CRP2: Apply appropriate academic and technical skills. CRP4: Communicate clearly and effectively and with reason CRP5: Consider the environmental, social and economic impacts of decisions

Time Frame	4 weeks

Topic
System Administration & IT Concepts

Alignment to Standards
8.1.12.CS.1: Describe ways in which integrated systems hide underlying implementation details to simplify user experiences. 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.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented. 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use. 8.1.12.AP.3: Select and combine control structures for a specific application based upon performance and readability, and identify trade-offs to justify the choice.

Learning Objectives and Activities
SWBAT answer the following questions: • What are the different types of operating systems out there? • What is the purpose of an operating system? • What steps should be followed to troubleshoot minor configure issues? • How do operating systems use file systems to manage data? • What is the role of a processor? • What is the difference between a 32-bit and 64-bit processor? • Is the a difference between laptops and tablets? • What are the different types of softwares? • What are the different types of software licenses • Why is application security important? • What are browser features? • How does creating user accounts and permissions enhance security?

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- What is system hardening?
- Why are security audits important?

SWBAT demonstrate understanding of the following:

- Operation systems
- Installation process for operations systems
- Troubleshooting steps and process
- Identify resources for finding additional information about their system
- Compare and contract the interface of Mac, Windows, and Linux
- Explain how operating systems manage data
- Compare and contrast file systems of different operating systems
- Explain the role of the processor in a computer system
- Explain the difference of a 32-bit and 64-bit processor?
- The key differences between laptops and tablets
- Different types of softwares and software licenses
- Application security
- Browsers and their features
- System hardening
- Security audits

Learning Activities:

- Troubleshooting activities
- Code HS Activities
- Configure a Computer Lab
- Analyze different device types
- Research different softwares and their purpose
- Browser configuration lab
- Class Discussion on operations systems
- Compare and contrast activities

Assessments

Formative:

- Discussion & Research
- Classwork
- CodeHS Activities
- Teacher Observation

Summative:

- Project/Group progress assessment
- Quizzes & Tests

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Alternative:

- Kahoot
- Quizizz
- Class Discussion
- Pictorial Learning Summaries

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest.

CompTIA ITF 1.1 Compare and construct notational systems
CompTIA ITF 1.3 Illustrate the basics of computing and processing
CompTIA ITF 1.5 Compare and contrast common units of measures
CompTIA ITF 2.6 Compare and contact common computing devices and their purposes
CompTIA ITF 2.7 Explain basic networking concepts
CompTIA ITF 3.1 Explain the purpose of operation systems
CompTIA ITF 3.2 Compare and contrast components of an operation system
CompTIA ITF 3.3 Explain the purpose and proper use of software
CompTIA ITF 3.4 Explain methods of application architecture and delivery methods
CompTIA ITF 3.5 Given a scenario, configure and use web browses
CompTIA ITF 3.6 Compare and contract general applications concepts and uses
CompTIA ITF 6.2 Explain methods to secure devices and best practices
CompTIA ITF 6.3 Summarize behavioral security concepts
CompTIA ITF 6.4 Compare and contrast authentication, authorization, accounting and non-repudiation concepts
CompTIA A 1001 1.1 Given a scenario, install and configure laptop hardware and components
CompTIA A 1001 1.2 Given a scenario, install components withing the display of a laptop
CompTIA A 1001 1.3 Given a scenario, use appropriate laptop features
CompTIA A 1002 1.4 Given a scenario, use appropriate Microsoft command line tools
CompTIA A 1002 1.9 Given a scenario, use features and tools of the Mac OC and Linux client/desktop operating systems
CSTA 2-IC-23 Describe tradeoffs between allowing information to be public and keeping information private and secure.
CSTA 2-NI-05 Explain how physical and digital security measures protect electronic information

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CSTA 3A-AP-20 Evaluate licenses that limit or restrict use of computational artifacts when using resources such as libraries.
CSTA 3A-IC-29 Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users
CSTA 3A-IC-30 Evaluate the social and economic implications of privacy in the context of safety, law, or ethics
CSTA 3A-NI-07 Compare various security measures, considering tradeoffs between the usability and security of a computing system
CSTA 3A-NI-08 Explain tradeoffs when selecting and implementing cybersecurity recommendations
CSTA 3B-AP-18 explain security issues that might lead to compromised computer programs

CYBER ORG 9-12.CS.OS Create a plan for hardening an operating system. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of how hardening an operating system can include shutting down unnecessary services and ports, installing updates and/ or patches, removing unused programs, and reviewing user privileges.

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.

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.

Career Education

CRP2: Apply appropriate academic and technical skills.
CRP4: Communicate clearly and effectively and with reason

Time Frame	1 week

Topic

PC Hardware: Inside the PC

Alignment to Standards

8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences
8.1.2.CS.2: Explain the functions of common software and hardware components of

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computing systems.
8.1.2.CS.3: Describe basic hardware and software problems using accurate terminology.
8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
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. Individuals 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 reinforced by the in & out game.
- Basic electronic seminar on sizing up the amount of power needed to run all
- Lecture and discussion on the various types of PC's available and their different needs.

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- Matching exercise to determine different specifications of different components.

Assessments

Formative:

- Opening story on typical technical specifications truths
- Classwork/Daily Activity & Homework
- Teacher Observation
- Exit examples of amazing builds

Summative:

- Individual PC Part Picker Build
- Quizzes & Tests

Benchmark:

- Defend Group Build Assessment

Alternative:

- Visual Lineup exercise
- 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 virtual words 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.

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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
Topic	
PC Hardware: Build	
Alignment to Standards	
8.1.2.CS.1: Select and operate computing devices that perform a variety of tasks accurately and quickly based on user needs and preferences 8.1.2.CS.2: Explain the functions of common software and hardware components of computing systems. 8.1.2.CS.3: Describe basic hardware and software problems using accurate terminology. 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors. 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 makes 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 systems.
- 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, and 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 Conne

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	2 weeks
Topic	
Data Security	
Alignment to Standards	
8.1.12.CS.1: Describe ways in which integrated systems hide underlying implementation details to simplify user experiences 8.1.12.NI.1: Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing 8.1.12.NI.2: Evaluate security measures to address various common security threats. • 8.1.12.NI.3: Explain how the needs of users and the sensitivity of data determine the level of security implemented. 8.1.12.NI.4: Explain how decisions on methods to protect data are influenced by whether the data is at rest, in transit, or in use. 8.1.12.AP.8: Evaluate and refine computational artifacts to make them more usable and	

accessible.

CSTA 2-NI-05 Explain how physical and digital security measures protect electronic information

Learning Objectives and Activities

SWBAT answer the following questions:

- How is your data used?
- What are the benefits of data response?
- What are the different database management systems?
- How to complete a Query Exploration?
- What commands are used in SQL injection attacks?
- How do attackers gain unauthorized access?
- Who are major developers and what developer tools are there?
- What are the differences of specific security measures?
- How can one test their vulnerability?

SWBAT demonstrate understanding of the following:

- Differentiate between data, information, and knowledge
- Explain the different states of data (in use, in transit, at rest) and provide examples of each
- Analyze the role of data centers in modern society
- Identify and explain the major uses of a database management system
- Define the different parts of a database (table, column, row)
- Create new tables and entries using SQL code
- Construct basic SQL queries using SELECT and WHERE keywords.
- Identify the commands used in SQL Injection attacks
- Explain how attackers gain unauthorized access through SQL Injection
- Describe the importance of input validation in preventing security vulnerabilities
- Explain how buffer and integer overflows can be exploited for security breaches
- Identify major developer tools within the inspect element
- Explain the purpose of developer tools
- Utilize basic developer tools functions like “view-source” and the console.
- Describe the potential vulnerabilities found within website code.
- Explain the importance of specific security measures: mantrap, door lock, biometric locks, USB locks, privacy screen
- Explain environmental impacts on devices and implement appropriate controls
- How to check their vulnerabilities online

Learning Activities:

- Class discussion on data usage and data response
- Virtual tour of Data Center

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- Query Exploration Submission
- Injection Practice
- Cross Site Scripting Activity
- Buffer and Integer Overflow
- Page Source Code Activity
- Capture the Flag activity

Assessments

Formative:

- Discussion & Research
- Classwork
- CodeHS Activities
- Teacher Observation

Summative:

- Project/Group progress assessment
- Quizzes & Tests

Alternative:

- Kahoot
- Quizizz
- Class Discussion
- Pictorial Learning Summaries

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments.
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 (e.g., 7.1.AL.IPERS.6).

CompTIA ITF 1.2 Compare and contrast types of attacks
CompTIA ITF 1.4 Explain the value of data and information
CompTIA ITF 3.9 Explain that importance of physical security controls
CompTIA ITF 4.1 Compare and contract programming language categories
CompTIA ITF 5.1 Explain database concepts and the purpose of a database

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CompTIA ITF 5.2 Compare and contrast various database structures
CompTIA ITF 5.3 Summarize methods used to interface with databases
CompTIA ITF 6.6 Explain common use of encryption
CompTIA ITF 6.7 Explain business continuity concepts

CYBER ORG 9-12.CS.HARD Identify methods of mitigating risk associated with connecting devices. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of risk such as compromised network security or data loss due to malicious incidents
CYBER ORG 9-12.SEC.AUTH Evaluate authentication and authorization methods and the risks associated with failure. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of authentication and authorization methods, such as certificate, token based, two-factor, multifactor, and biometric.
CYBER ORG 9-12.SEC.PHYS Analyze the different types of attacks that affect physical security. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of physical security attacks, such as social engineering, poor security policies, and malicious actors.
CYBER ORG 9-12.SEC.CTRL Justify the use of Defense in Depth and the need for physical access controls. Clarification statement: At this level, student discussions should focus on previous standards as well as grade-appropriate examples of various physical access controls, such as proximity badges, PIN codes, and man traps.

Technology Integration

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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.

Career Education

CRP2: Apply appropriate academic and technical skills.
CRP4: Communicate clearly and effectively with reason.

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Time Frame	4 weeks

Topic

Artificial Intelligence

Alignment to Standards

8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.

Learning Objectives and Activities

SWBAT answer the following questions:

- What is Artificial Intelligence?
- How does one test Intelligence?
- What is Generative vs Predictive AI?
- What is a LLM?
- What is prompt engineering?
- How to use AI?
- What is machine learning?
- What is supervised learning?
- What is unsupervised learning?
- How do you train an AI model?
- What are some various AI models in various industries?
- What are the risks of AI?

SWBAT demonstrate understanding of the following:

- Definition of Artificial intelligence
- The Turing Test
- Usage for generative bs predictive AI
- Large Language Models
- Prompt engineering best practices
- Who runs AI companies
- Machine learning and neural networks
- The different learning models for AI
- What can occur when bias is in training
- Ethics of Artificial intelligence
- Human absorb bias from AI
- AI Stereotypes
- Deepfakes and AI Misinformation

Learning Activities:

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- Exploration Labs
- CodeHS Activities
- Test of Intelligence Activity
- Google Experiments
- Comparison charts
- Research & Reflection
- Machine Learning Lab
- Class Discussion

Assessments

Formative:

- Code HS Activities
- Class Discussions
- Classwork
- Teacher Observations

Summative:

- Test & Quizzes

Benchmark:

- AI CodeHS Pretest
- AI CodeHS Posttest

Interdisciplinary Connections

Career Readiness, Life Literacies, and Key Skills

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3). • 9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving (e.g., 1.3E.12profCR3.a)
9.4.12.DC.1: Explain the beneficial and harmful effects that intellectual property laws can have on the creation and sharing of content (e.g., 6.1.12.CivicsPR.16.a).
9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.).

Technology Integration

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Career Education

CRP2: Apply appropriate academic and technical skills.
CRP4: Communicate clearly and effectively with reason.

Time Frame	1 week

Topic

Cyber & AI Capstone Project

Alignment to Standards

8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices.
8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
8.2.12.EC.2: Assess the positive and negative impacts of emerging technologies on developing countries and evaluate how individuals, non-profit organizations, and governments have responded.
8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.
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 a capstone project and how do they select a project that aligns with their interests and skills?
- How do I research their project topic and analyze their findings?
- What is a completed capstone project?
- How do I incorporate feedback into a project?

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- How do I finalize their project and prepare it for submission?
- How do I communicate my ideas on this topic the best way?

SWBAT demonstrate understanding of the following:

- The objective of this capstone project is to provide students with an opportunity to apply their knowledge and skills in cybersecurity to create a comprehensive project that demonstrates their mastery of the subject matter. Through this project, students will showcase their ability to think critically, problem-solve, and communicate effectively.
- The ability to present their capstone project/ideas to the class.
- The ability to develop and revise an idea to present.

Learning Activities:

- Students will be provided with a list of project ideas or allowed to propose their own. They will select a project, create a project plan, and outline the steps they need to take to complete their project.
- Project Content and Objective Statement.
- Students will conduct research on their chosen project topic, analyze their findings, and develop a comprehensive report that summarizes their research and analysis.
- Students will begin developing their project, using the research and analysis they conducted earlier in the week. They will create a rough draft of their project and receive feedback from their peers and instructor.
- Students will refine their project based on feedback they received from their peers and instructor. They will incorporate any necessary changes to their project and continue to work on their final product.
- List out three ideas that could make your project better.
- Students will finalize their project and prepare it for submission. They will create a presentation or report that summarizes their project and provides an overview of their findings.
- Students will present their capstone project to the class, showcasing their findings and the skills they have developed throughout the course. They will receive feedback and criticism from their peers and instructor.

Assessments

Formative:

- Project Outline.
- Rough Draft of Project.

Summative:

- Final Project

Benchmark:

- Post-assessment

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Alternative:

- All projects are students' choice

Interdisciplinary Connections

Conventions of Standard English
L.11-12.1. Demonstrate command of the conventions of standard English grammar and usage when writing or speaking.
A. Apply the understanding that usage is a matter of convention, can change over time, and is sometimes contested.

L.11-12.2. Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.
A. Observe hyphenation conventions.
B. Spell correctly.

Career Readiness, Life Literacies, and Key Skills

9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources (e.g., NJSLSA.W8, Social Studies Practice: Gathering and Evaluating Sources.

Technology Integration

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Career Education

CRP4: Communicate clearly and effectively and with reason.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.