

# Nevada Middle School Computer Science Syllabus

Middle School - Across Three Years (210-235 hours)

## Course Overview and Goals

This course contains computer science topics that align with Nevada’s 6-8 computer science standards. The course should be spread across grades six through eight. Students explore topics in algorithms, programming, computing systems, impact of computing, networks, and more.

## Learning Environment

This course utilizes a blended classroom approach. The content is fully web-based, with students writing and running code in the browser. Each module of the course is broken down into lessons. Lessons consist of video tutorials, short quizzes, example programs to explore, and programming exercises.

## Programming Environment

For the programming units, students write and run JavaScript programs in the browser using the CodeHS editor. They will also explore and use the SQL programming language. For the web design unit, students write HTML, CSS, and JavaScript code in the browser using the CodeHS online editor. Teachers can choose to have students write code using either blocks or text.

## Prerequisites

This course is designed for complete beginners with no previous background in computer science. The course is highly visual, dynamic, and interactive, making it engaging for new coders.

## More Information

Browse the content of this course at <https://codehs.com/course/7992>

## Course Breakdown

### Module 1: Digital Citizenship and Cyber Hygiene (1 week/5 hours)

Students learn topics on Internet etiquette and how to stay safe on the world wide web. Students will look at the potential effects of their digital footprints, how to protect information from online risks, and the importance of creative credit.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Digital Footprint and Reputation</li> <li>● Privacy and Security</li> <li>● Creative Credit and Copyright</li> <li>● Hacking Ethics</li> <li>● Common Security Problems</li> </ul>
Example Assignments	<ul style="list-style-type: none"> <li>● Digital Footprint and Reputation               <ul style="list-style-type: none"> <li>○ What is a digital footprint?</li> <li>○ What is <b>your</b> digital footprint and reputation?</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ What does it mean that the internet is public and permanent?</li> <li>○ Who looks at your digital footprint and reputation?</li> <li>○ What are some recommended social media guidelines?</li> <li>○ How can you maintain your digital footprint?</li> <li>○ What does your digital footprint say about you?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ What is your digital footprint?</li> <li>■ Are you going to make any changes in what you post on social media?</li> </ul> </li> <li>● Privacy and Security <ul style="list-style-type: none"> <li>○ What are data privacy and security?</li> <li>○ How can you keep personal data secure and private?</li> <li>○ What can happen if your data is stolen and what can you do about it?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Test out various passwords on a site</li> <li>■ Explore Google’s privacy policy: What do they know about you?</li> </ul> </li> </ul> </li> <li>● Creative Credit and Copyright <ul style="list-style-type: none"> <li>○ What is copyright?</li> <li>○ What are the different types of copyright licenses?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Create citations for sources</li> <li>■ Explore image search tools</li> </ul> </li> </ul> </li> <li>● Hacking Ethics <ul style="list-style-type: none"> <li>○ What are hackers?</li> <li>○ Are there different kinds of hackers? (white, black, grey)</li> <li>○ What are bug bounty programs?</li> <li>○ Is hacking always illegal?</li> <li>○ What are the consequences of illegal hacking?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Explore what penetration testing is</li> <li>■ Sign an ethical hacker agreement</li> </ul> </li> </ul> </li> </ul>
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### Module 2: Project: Public Service Announcement (1 week/5 hours)

Students create a Public Service Announcement (PSA) to teach their peers about digital citizenship and cyber hygiene.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Project: PSA</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Project: Create a Public Service Announcement <ul style="list-style-type: none"> <li>○ Create a Public Service Announcement (PSA) to teach your peers about your selected topic in digital citizenship and cyber hygiene. You can select any of the topics covered in this module. Be creative and make it fun! You could make a video, song, poster, or slideshow.</li> </ul> </li> </ul>

### Module 3: Programming with Turtle Graphics (5 weeks/ 25 hours)

Students learn Python commands, functions, and control structures by drawing shapes on their screen and solving puzzles with Turtle Graphics!

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● What is a Command?</li> <li>● Moving Tracy</li> <li>● Tracy's Coordinate System</li> <li>● For Loops</li> <li>● Functions and Parameters</li> <li>● Top Down Design</li> <li>● Variables</li> <li>● User Input</li> <li>● If/else Statements</li> <li>● While Loops</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● 34 exercises total</li> <li>● Example exercises: <ul style="list-style-type: none"> <li>○ Row of Circles <ul style="list-style-type: none"> <li>■ In this program, Tracy should draw a row of circles across the width of the canvas using a for loop.</li> </ul> </li> <li>○ Circle Pyramid <ul style="list-style-type: none"> <li>■ Write a program that directs Tracy to draw a pyramid with 3 circles on the bottom row, 2 in the middle, and 1 on top.</li> </ul> </li> <li>○ Bubble Wrap 2.0 <ul style="list-style-type: none"> <li>■ In this program, you should have Tracy add highlights to each bubble from our Bubble Wrap example program. Use top down design to break this large problem into smaller pieces!</li> </ul> </li> <li>○ Rating <ul style="list-style-type: none"> <li>■ Write a program that shows a graphical representation of a user's rating value. If the value is between 1 and 4, draw a red X. If it is between 5 and 7, draw a yellow horizontal line. If it is an 8 or above, draw a green checkmark.</li> </ul> </li> </ul> </li> </ul>

#### Module 4: Web Design (6 weeks/30 hours)

Students learn the basics of HTML, CSS, and the processes involved in viewing web pages on the internet.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Creating webpages using HTML <ul style="list-style-type: none"> <li>○ Links</li> <li>○ Images</li> <li>○ Lists</li> <li>○ Tables</li> <li>○ Inline styling</li> </ul> </li> <li>● Styling webpages with CSS <ul style="list-style-type: none"> <li>○ Creating CSS rules</li> <li>○ CSS classes</li> <li>○ CSS IDs</li> </ul> </li> </ul>
Example Assignments	<ul style="list-style-type: none"> <li>● Links <ul style="list-style-type: none"> <li>○ Learn how to link different pages together</li> <li>○ Example Exercise: Create a webpage that provides links to your favorite books</li> </ul> </li> <li>● Images <ul style="list-style-type: none"> <li>○ Learn how to add and format images</li> <li>○ Example Exercise: Create a collage of images</li> </ul> </li> <li>● Tables <ul style="list-style-type: none"> <li>○ Learn how to create and style tables</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Example Exercise: Create a table describing your favorite music artists and songs</li> <li>● Styling with CSS <ul style="list-style-type: none"> <li>○ Use CSS to add background colors, font colors, font styles, borders, and position elements on the page</li> <li>○ Example Exercise: Create CSS classes and IDs to apply formatting to a BINGO board</li> <li>○ Example Exercise: Create CSS classes to style a music library web page</li> <li>○ Example Exercise: Create CSS Rules to put a Karel puzzle together</li> </ul> </li> <li>● Final Project <ul style="list-style-type: none"> <li>○ Build your own homepage using everything you've learned in the module</li> <li>○ This homepage can serve as your personal portfolio of creative projects as you continue through the course!</li> </ul> </li> </ul>
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### Module 5: Project: Your First Website (1 week/5 hours)

Students create a personal website that can be used to serve as a portfolio for their future work.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Project: PSA</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Final Project <ul style="list-style-type: none"> <li>○ Build your own homepage using everything you've learned in the module</li> <li>○ This homepage will serve as your personal portfolio of creative projects as you continue through the course!</li> </ul> </li> </ul>

### Module 6: Networking Fundamentals (3-4 weeks/15-20 hours)

This module explores the structure and design of the internet and networks, and how this design affects the reliability of network communication, the security of data, and personal privacy. We will learn how the Internet connects computers all over the world. Finally, we will explore basic networking protocols, practical networking, and how networks are secured.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Introduction to the Internet</li> <li>● Internet Hardware</li> <li>● Internet Addresses</li> <li>● Domain Name System (DNS)</li> <li>● Routing</li> <li>● Packets and Protocols</li> <li>● The Internet and Cybersecurity</li> <li>● Impact of the Internet</li> <li>● Network Hacks</li> <li>● Securing a Network</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Introduction to the internet <ul style="list-style-type: none"> <li>○ What is the Internet? How does it work? What have been its impact on society?</li> <li>○ Why do we need protocols for the Internet?</li> <li>○ Example Activity <ul style="list-style-type: none"> <li>■ Explore the different levels of the internet.</li> </ul> </li> </ul> </li> </ul>

- Internet hardware
  - Vocabulary: bandwidth, bitrate, latency
  - Why are protocols so important?
  - How do we send data over the Internet?
  - Example Activities
    - Explore how data is able to be transmitted across the ocean by using underwater cables
    - Explore the role of simple and complex networks and routers
- Internet Addresses
  - Vocabulary: Internet Protocol (IP)
  - How do IP addresses compare to postal addresses?
  - How IP addresses work?
  - Example Activities
    - Explore the differences between IPv4 and IPv6. Why are we running out of addresses?
    - Trace a website request from the server, through the network, and to your computer
- Domain Name System (DNS)
  - How does DNS help with sending digital information and IP addresses?
  - Example Activities
    - Explore the process of how requesting a web resource works
- Routing
  - How is routing used to send messages / data?
  - Why is redundancy a good thing for the Internet? (fault tolerant)
- Packets and Protocols
  - How data is transmitted?
  - How are internet packets able to find their way to your computer?
  - Example Activities:
    - Explain in your own words how a request from your computer travels through the various levels of servers to reach and return the correct webpage and resources?
    - As a class, create a protocol that will allow one classmate to send another classmate a note, without the need for talking to each other.
  - What are the standard protocols for the Internet and how do they work? (TCP/IP, HTTP)
- The Internet and Cybersecurity
  - What are cybercrime and cyberwarfare?
  - How do we network attacks? (certificate authorities, public key encryption)
- Network Hacks
  - What are common network attacks?
  - Explain common network attacks and how they happen. (DNS spoofing, DoS/DDoS, Waterhole attacks, fake WAP, eavesdropping)
- Securing a Network
  - How can we detect intrusions? (checking logs, firewall rules, intrusion detection systems - IDS)
  - What are some recommended approaches for mitigating or preventing network attacks?

## Module 7: Project: Secure the Company's Network (1-2 weeks/5-10 hours)

Students propose cybersecurity solutions for a company facing network security breaches.

Objectives / Topics Covered	<ul style="list-style-type: none"><li>● Project: Secure the Company's Network</li></ul>
Example Assignments / Labs	<ul style="list-style-type: none"><li>● Final Project<ul style="list-style-type: none"><li>○ Create a basic network configuration simulation that is optimized for security via the following site: <a href="http://malkiah.github.io/NetworkSimulator/simulator01.html#">http://malkiah.github.io/NetworkSimulator/simulator01.html#</a></li></ul></li><li>● Final course Project / Challenge:<ul style="list-style-type: none"><li>○ Walk through a simulated attack from the attacker and defender perspectives and incorporate all techniques and recommendations garnered from the course.</li></ul></li></ul>

## Module 8: Introductions to Programming with Karel the Dog (7 weeks/35 hours)

Students learn foundational skills in programming with Karel by simplifying JavaScript to four simple commands. Using these commands, students solve increasingly difficult problems and explore how complex programming languages can be developed from simple commands.

Objectives / Topics Covered	<ul style="list-style-type: none"><li>● Commands</li><li>● Defining vs. Calling Methods</li><li>● Designing methods</li><li>● Program entry points</li><li>● Control flow</li><li>● Looping</li><li>● Conditionals</li><li>● Classes</li><li>● Commenting code</li><li>● Preconditions and Postconditions</li><li>● Top Down Design</li></ul>
Example Assignments	<ul style="list-style-type: none"><li>● 30 Karel Programming Exercises and Challenges in total</li><li>● Program-specific tasks for Karel the Dog<ul style="list-style-type: none"><li>○ Example Exercise: Pyramid of Karel Write a program to have Karel build a pyramid. There should be three balls on the first row, two in the second row, and one in the third row.</li></ul></li><li>● Teach Karel new commands like <code>turnRight()</code> or <code>makePancakes()</code><ul style="list-style-type: none"><li>○ Example Exercise: Pancakes Karel is the waiter. He needs to deliver a stack of pancakes to the guests on the 2nd, 4th, and 6th avenue. Each stack of pancakes should have three pancakes. Create a method called <code>makePancakes()</code> to help Karel solve this problem.</li></ul></li><li>● Solve large Karel problems by breaking them down into smaller, more manageable problems using Top Down Design<ul style="list-style-type: none"><li>○ Example Exercise: The Two Towers In this program, Karel should build two towers of tennis balls. Each tower should be 3 tennis balls high. At the end, Karel should end up on top of the second tower, facing East.</li></ul></li><li>● Using control structures and conditionals to solve general problems<ul style="list-style-type: none"><li>○ Example Exercise: Random Hurdles Write a program that has Karel run to the other side of first street,</li></ul></li></ul>

	jumping over all of the hurdles. However, the hurdles can be in random locations. The world is fourteen avenues long.
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**Unit 9: Digital Information (5 weeks/25 hours)**

Students learn about the various ways we represent information digitally.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● How digital data is represented</li> <li>● Encoding data</li> <li>● Converting and using different number systems             <ul style="list-style-type: none"> <li>○ Binary</li> <li>○ Hexadecimal</li> </ul> </li> <li>● Manipulating images at the pixel level</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Encoding data             <ul style="list-style-type: none"> <li>○ Create your own encoding scheme</li> <li>○ Encode images using binary</li> <li>○ Example Activity:                 <ul style="list-style-type: none"> <li>■ Write a message by encoding the characters in binary, using the ASCII codes.</li> </ul> </li> </ul> </li> <li>● Using different number systems             <ul style="list-style-type: none"> <li>○ Convert numbers between decimal, binary, and hexadecimal</li> <li>○ Example Activity:                 <ul style="list-style-type: none"> <li>■ Earn a high score playing the decimal to binary game or decimal to hexadecimal game. Click on the digits to change their values and make the binary or hexadecimal number match the target decimal value.</li> </ul> </li> </ul> </li> <li>● Manipulating Images             <ul style="list-style-type: none"> <li>○ Make different colors by changing the amount of red, green, and blue present</li> <li>○ Create image filters</li> <li>○ Create images pixel by pixel</li> <li>○ Example Activity:                 <ul style="list-style-type: none"> <li>■ Create a pixel rainbow by typing out the hexadecimal color encoding for each pixel</li> </ul> </li> </ul> </li> </ul>

**Module 10: Software Security (3-4 weeks/15-20 hours)**

In this module, students will learn what happens when running a web application and how to look inside web apps using developer tools, source code, and more. They will learn basic SQL and common attacks like SQLi. Students will also be able to recommend solutions for flawed security systems.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Inside Web Applications</li> <li>● Developer Tools</li> <li>● The Value of Data</li> <li>● SQL Overview             <ul style="list-style-type: none"> <li>○ What is SQL?</li> <li>○ Structuring Data in SQL</li> <li>○ Basic Querying in SQL</li> <li>○ Filtering Queries in SQL</li> </ul> </li> <li>● Clients, Servers, Databases</li> <li>● Common Security Problems</li> </ul>
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	<ul style="list-style-type: none"> <li>● SQL Injection <ul style="list-style-type: none"> <li>○ SQLi Overview</li> <li>○ Types of SQLi</li> <li>○ Preventing SQLi</li> </ul> </li> </ul>
<p>Example Assignments / Labs</p>	<ul style="list-style-type: none"> <li>● Inside Web Applications <ul style="list-style-type: none"> <li>○ View page source (images, navigation and page layout, stylesheets, JavaScript, minified code)</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ View page source scavenger hunt</li> <li>■ Getting started with OWASP</li> </ul> </li> </ul> </li> <li>● Developer Tools <ul style="list-style-type: none"> <li>○ Use the inspect tools to look more deeply inside of web apps</li> <li>○ How does view page source compare to inspect in terms of information about the site / app?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Practice using the Chrome developer tools</li> <li>■ Change a favorite site using the Chrome developer tools on your end only. Take a screenshot of your change.</li> </ul> </li> </ul> </li> <li>● Data Visualizations</li> <li>● Design a Survey</li> <li>● SQL Overview <ul style="list-style-type: none"> <li>○ What is SQL?</li> <li>○ How do we structuring data using SQL?</li> <li>○ How do we query databases using SQL?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Use the SELECT statement to query a database</li> <li>■ Use the WHERE clause to query a database</li> </ul> </li> </ul> </li> <li>● Clients, Servers, Databases</li> <li>● Common Security Problems <ul style="list-style-type: none"> <li>○ What is the “Fortification Principle”?</li> <li>○ What are some tips about HTTP vs. HTTPS, password fields and CAPTCHA that can help us to navigate more securely on the Web?</li> </ul> </li> <li>● SQL Injection <ul style="list-style-type: none"> <li>○ SQLi Overview <ul style="list-style-type: none"> <li>■ What is SQLi?</li> <li>■ Why is SQLi a problem?</li> <li>■ What happens during a SQLi attack?</li> <li>■ What is the the fallout of a SQLi attack?</li> <li>■ How does SQLi work?</li> <li>■ How do hackers use SQL in a SQLi?</li> </ul> </li> <li>○ What are the types of SQLi (error-based, union-based, blind) <ul style="list-style-type: none"> <li>■ What is the underlying SQL behind the scenes that hackers may be trying to hack?</li> </ul> </li> <li>○ How to we mitigate or prevent SQLi? <ul style="list-style-type: none"> <li>■ What are the OWASP recommendations?</li> <li>■ How can we tell if our code is vulnerable?</li> </ul> </li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Discuss the Equifax SQL injection attack</li> <li>■ Practice basic SQLi on a safe site</li> <li>■ Research SQLi prevention</li> </ul> </li> </ul> </li> </ul>

## Module 11: The ABCs of Cryptography (3-4 weeks/15-20 hours)

In this module, we will dive into the history of cryptography systems, the motivation behind using encryption systems, and basic cryptography systems. Additionally, we will explore topics on how to use cryptography, cryptology, and cryptanalysis to decode a message without the use of a key. Finally, we will look into more advanced cryptographic topics like public key cryptography and hash functions.

<p>Objectives / Topics Covered</p>	<ul style="list-style-type: none"> <li>● Cryptography, Cryptology, Cryptanalysis</li> <li>● History of Cryptography</li> <li>● Why do we Need to Encrypt Data?</li> <li>● Basic Cryptography Systems: Caesar Cipher</li> <li>● Basic Cryptography Systems: Cracking the Caesar Cipher</li> <li>● Basic Cryptography Systems: Vigenère Cipher</li> <li>● Advanced Cryptography</li> <li>● Hash Functions</li> <li>● Hash Function Development</li> </ul>
<p>Example Assignments / Labs</p>	<ul style="list-style-type: none"> <li>● Cryptography, Cryptology, Cryptanalysis             <ul style="list-style-type: none"> <li>○ Why do we need some secrecy in our transparent information age?</li> <li>○ Explain general encryption with data, keys</li> <li>○ Example activities:                 <ul style="list-style-type: none"> <li>■ Video and discussion on securing the cloud</li> <li>■ Passing notes in class (offline activity)</li> </ul> </li> </ul> </li> <li>● History of Cryptography             <ul style="list-style-type: none"> <li>○ Why do we encrypt?</li> <li>○ What are some classic encryption techniques?</li> <li>○ What is the flaw in substitution ciphers?</li> <li>○ What was The Enigma during WW2?</li> <li>○ What is modern cryptography and how has cryptography changed over time?</li> <li>○ What is 256-bit key encryption and how does this help cryptography overall?</li> <li>○ Example activities:                 <ul style="list-style-type: none"> <li>■ How did the Enigma work?</li> </ul> </li> </ul> </li> <li>● Why do we Need to Encrypt Data?             <ul style="list-style-type: none"> <li>○ Explore the CIA Triad and encryption</li> <li>○ Example activities:                 <ul style="list-style-type: none"> <li>■ Telephone game with math (offline)</li> <li>■ Modulo math activity sheet</li> </ul> </li> </ul> </li> <li>● Basic Cryptography Systems: Caesar Cipher             <ul style="list-style-type: none"> <li>○ Explore examples of the Caesar cipher</li> <li>○ Example activities:                 <ul style="list-style-type: none"> <li>■ Practice with a Caesar Cipher JavaScript program</li> <li>■ Modify the program to create the decrypting Caesar program</li> </ul> </li> </ul> </li> <li>● Basic Cryptography Systems: Cracking the Caesar Cipher             <ul style="list-style-type: none"> <li>○ How do we solve the Caesar Cipher with brute force and using letter frequency analysis?</li> <li>○ Example activities:                 <ul style="list-style-type: none"> <li>■ Practice cracking Caesar Cipher with brute force</li> <li>■ Practice cracking Caesar Cipher with letter frequency</li> </ul> </li> </ul> </li> <li>● Basic Cryptography Systems: Vigenère Cipher             <ul style="list-style-type: none"> <li>○ Explore examples of the Vigenère Cipher</li> <li>○ Example activities:</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>■ Practice with a Vigenère Cipher JavaScript program</li> </ul> </li> </ul> </li> <li>● Advanced Cryptography <ul style="list-style-type: none"> <li>○ What are the problems with Caesar cipher? (History recap)</li> <li>○ What does today's cryptography look like?</li> <li>○ What does "hard vs. easy problems to crack" mean?</li> <li>○ What kinds of encryption are there? (symmetric, asymmetric, public key)</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Discuss resources related to public key cryptography</li> </ul> </li> </ul> </li> <li>● Hash Functions <ul style="list-style-type: none"> <li>○ What is cryptographic hashing?</li> <li>○ How is hashing used?</li> <li>○ What is a hash function? Why are hash functions used?</li> <li>○ What does the ideal hash function do?</li> <li>○ How do attackers try to crack a hashing algorithm?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Use a hash generator to create hashes for various input</li> </ul> </li> </ul> </li> <li>● Hash Function Development <ul style="list-style-type: none"> <li>○ How can we prevent hash function cracking?</li> <li>○ Why is modulo math so important for hash programs?</li> <li>○ Example activities: <ul style="list-style-type: none"> <li>■ Practice modulo math problems (offline)</li> <li>■ Test a simple hash program</li> </ul> </li> </ul> </li> </ul>
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### Module 12: Project: Classic Cipher Newscast (1 week/5 hours)

Students develop and present a newscast on a classic cipher.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Project: Classic Cipher Newscast</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Project: Develop a hash program <ul style="list-style-type: none"> <li>○ Modify a hash function program with new math to create different hashes for the same inputs. Explain how your new program works and show before and after results for 3 different input strings that the new hash function changed the hash created.</li> </ul> </li> </ul>

### Module 13: The Internet (5 weeks/25 hours)

Students explore the structure and design of the internet, and how this design affects the reliability of network communication, the security of data, and personal privacy.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Structure of the internet</li> <li>● How network data is transmitted</li> <li>● Hardware involved in the transmission of data</li> <li>● How the internet has impacted everyday life</li> <li>● Project: The Effects of the Internet</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Structure of the internet <ul style="list-style-type: none"> <li>○ Explore the differences between IPv4 and IPv6. Why are we running out of addresses?</li> <li>○ Explore the different levels of the internet.</li> <li>○ Example Activity <ul style="list-style-type: none"> <li>■ Trace a website request from the server, through the</li> </ul> </li> </ul> </li> </ul>

	<p style="text-align: center;">network, and to your computer</p> <ul style="list-style-type: none"> <li>● How data is transmitted <ul style="list-style-type: none"> <li>○ How are internet packets able to find their way to your computer?</li> <li>○ Explain in your own words how a request from your computer travels through the various levels of servers to reach and return the correct webpage and resources?</li> <li>○ Example Activity: <ul style="list-style-type: none"> <li>■ As a class, create a protocol that will allow one classmate to send another classmate a note, without the need for talking to each other.</li> </ul> </li> </ul> </li> <li>● Hardware involved <ul style="list-style-type: none"> <li>○ Explore the role of routers</li> <li>○ Why are protocols so important?</li> <li>○ Explore how data is able to be transmitted across the ocean by using underwater cables</li> </ul> </li> <li>●</li> </ul>
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**Module 14: Project: The Effects of the Internet (1 week/5 hours)**

Students choose an innovation that was enabled by the Internet and explore the effects of this innovation.

Objectives / Topics Covered	<ul style="list-style-type: none"> <li>● Project: Classic Cipher Newscast</li> </ul>
Example Assignments / Labs	<ul style="list-style-type: none"> <li>● Create a presentation, graphic, video, or audio recording detailing a specific Internet-Based Innovation. The subject may be a product that depends on the internet for its core functionality, a cyber security innovation, or social phenomenon. What is the purpose of the innovation? What are the beneficial and harmful effects this innovation has had?</li> </ul>