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Example of K-12 Scope and Sequence with Skill Struck

KINDERGARTEN

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Kindergarten Computer Science Basics + Block Coding	Full Year 1-4x/ month @ 30-35 min per lesson	Block-based coding	**Coding Concepts:** algorithms, events and motion, looks, loops **CS Concepts:** computer devices, navigation, identifying problems, digital citizenship, data, passwords, digital footprint **Course Outcomes:** At the completion of this course students will be able to: 1. Identify computer hardware, software, and common computer problems 2. Explain what an algorithm is and create algorithms through unplugged activities 3. Identify patterns in data charts to make predictions 4. Program algorithms using block coding techniques

GRADE 1

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
1st Grade Computer Science Basics + Block Coding	Full Year 1-4x/ month @ 30-35 min per lesson	Block-based coding	**Coding Concepts:** algorithms, events, motion, looks, loops, control **CS Concepts:** hardware and software, troubleshooting, computer devices, keyword searches, cyberbullying, internet safety and cybersecurity, debugging, data **Course Outcomes:** At the completion of this course students will be able to: 1. Identify computer hardware, software, and common computer problems 2. Identify what makes a good digital citizen 3. Create algorithms through unplugged activities 4. Represent data and draw conclusions in multiple visual models 5. Program algorithms using block coding techniques

GRADE 2

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
2nd Grade Computer Science Basics + Block Coding	Full Year 1-4x/ month @ 30-35 min per lesson	Block-based coding	**Coding Concepts:** algorithms, events, motions and looks, loops, control **CS Concepts:** hardware and software, troubleshooting and debugging, technology in our lives, cyberbullying, digital footprint, internet safety, cybersecurity, passwords, data **Course Outcomes:** At the completion of this course students will be able to: 1. Identify how the internet transfers information Create and identify strong passwords 2. Identify what makes a good digital citizen 3. Collect data and draw conclusions 4. Program algorithms using block coding techniques

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Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Blocks Pro	Full year 1-4x/ month @50 min per lesson	Block-based coding	**Coding Concepts:** algorithms, events, variables, loops, sequencing, motion, looks and sounds, broadcasting messages, sensors, operators **CS Concepts:** computer hardware and software, internet network, computers' effect on culture, troubleshooting, debugging, internet safety, cybersecurity, computer devices, cyberbullying, digital footprint, encryption and decoding, binary data, file management, accessibility **Course Outcomes:** At the completion of this course students will be able to: 1. Write programs that direct computers to follow instructions 2. Time and control character movement and animation 3. Improve computational artifacts based on peer feedback and accessibility considerations 4. Express technology's influence on the world 5. Determine solutions to computer issues using troubleshooting strategies
Puzzles	Full year 1-4x/ month @50 min per lesson	Block-based coding, HTML/ text-based	**Coding Concepts:** algorithms, sequencing, events, variables, conditionals, loops **CS Concepts:** hardware and software, troubleshooting and debugging, computer systems, kindness, cyberbullying, digital footprint, internet safety and cybersecurity, encryption and decoding, binary, impacts of computing, file management, accessibility **Course Outcomes:** At the completion of this course students will be able to: 1. Write programs that direct computers to follow instructions 2. Create programs that include sequences, events, variables, loops, and conditionals 3. Improve computational artifacts based on peer feedback and accessibility considerations 4. Express technology's influence on the world

GRADE 3-5

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Robotics	Full year 1-4x/ month @50 min per lesson	Block-based coding	**Coding Concepts:** LED, inputs and outputs, strings, numbers, loops, conditionals, if/else statements, variables

CS concepts: hardware and software, debugging and troubleshooting, cyberbullying and digital footprints, computer devices and systems, internet safety and cybersecurity, computers' effect on culture, encryption and decoding, binary, accessibility

Course Outcomes: At the completion of this course students will be able to:

1. Write programs that direct a micro:bit to follow instructions
2. Create programs that include sequences, events, variables, loops, and conditionals
3. Collaborating with peers, program a game of Rock, Paper, Scissors
4. Improve computational artifacts based on peer feedback and accessibility considerations |
| *Web Development* | Full year 1-4x/ month @50 min per lesson | HTML/text-based | **Coding Concepts:** HTML basics, heading tags, text color, fonts, background color, paragraph tags, breaks, text alignment, events, variables, conditionals, loops

CS Concepts: troubleshooting and debugging, cyberbullying, digital footprint, internet safety and cybersecurity, accessibility, computer systems, computers' effect on culture, encryption and decoding, binary

Course Outcomes: At the completion of this course students will be able to:

1. Create a website using advanced HTML syntax coding techniques
2. Create programs that include sequences, events, variables, loops, and conditionals
3. Improve computational artifacts based on peer feedback and accessibility considerations
4. Express technology's influence on the world
5. Identify binary code and create bitmaps |

GRADE 6-8

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Python Turtles	3x/week @ 50min each Semester	Python Turtles	**Coding Concepts:** programming Languages, intro to turtles, moving the turtle, draw shapes with python turtles, change screen color & title, turtle error messages & debugging, variables, customize your turtle, customize the pen, pen up/down, print statement, inputs/outputs, data types, concatenation, converting data types, math, for loops, if statements, conditionals, functions, nested loops, while loops

CS Concepts: history of computer science, computer parts, internet of things, cloud computing, OS systems, memory, troubleshooting, outside libraries, the internet, search engines, digital citizenship, digital footprint, accessibility, online safety, checking for credibility, copyright, career exploration, digital wellness, cyberbullying, simulations, binary, AI & machine learning

Course Outcomes: At the completion of this course students will be able to:

1. Write programs that make computers follow instructions

2. Write code that makes decisions, choosing between multiple options

3. Write code that loops, repeating instructions until certain outcomes are reached

4. Organize their code to be more efficient and useful

5. Use functions to write multiple sections of code that communicate with each other

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Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Exploring Computer Science	3x/week @ 50min each Semester	HTML/CSS Micro:bit	**Coding Concepts:** HTML basics, heading tags, text colors, fonts, HTML structure, background color, HTML title, paragraphs, lists, links, images, buttons, background images, videos, image link, CSS, external style sheet, Micro:bit, inputs/outputs, show numbers/strings, forever functions, buttons, if statements, conditionals, for loops, variables, temperature, movement, music, light, compass **CS Concepts:** computer parts, the internet, troubleshooting, career exploration, digital citizenship, copyright, digital footprint, accessibility, social media, data compression, storage, binary, market research, artificial intelligence, ethics, flow charts, minimum spanning trees **Course Outcomes:** At the completion of this course students will be able to: 1. Write programs that make computers follow instructions 2. Write code that makes decisions, choosing between multiple options 3. Write code that loops, repeating instructions until certain outcomes are reached 4. Organize their code to be more efficient and useful 5. Use functions to write multiple sections of code that communicate with each other
Computer Science Principles	3x/week @ 50min each Semester	JavaScript	**Coding Concepts:** JavaScript intro, console log, alerts, prompts, concatenation, math, functions, parameters, commenting, if statements, arrays, for loops, while loops, HTML headings, paragraphs, HTML structure **CS Concepts:** passwords, digital citizenship, social media, the internet, cookies, digital privacy, phishing, ciphers, data representation, collecting data, the digital divide, career exploration, resume, accessibility, app design, copyright, types of threat, binary, flow charts, artificial intelligence **Course Outcomes:** At the completion of this course students will be able to: 1. Write programs that make computers follow instructions 2. Write code that makes decisions, choosing between multiple options 3. Write code that loops, repeating instructions until certain outcomes are reached 4. Organize their code to be more efficient and useful 5. Use functions to write multiple sections of code that communicate with each other

GRADE 8-10

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Creative Coding	3x/week @ 50min each Semester	PyGame	**Coding Concepts:** intro to python, variables, input/output, variable types, comments, while loops, drawing circle/rectangles/triangles/arcs, random, text on screen, math, timer counting up/down, animate drawings, if statements, bounce drawings, move drawing with keyboard, move drawing with mouse, ping pong game, snake game

CS Concepts: problem solving process, pseudocode, game design process, career exploration, gamification methods, ethics, game genres (action, adventure, role-playing, simulation, strategy, hybrid), player perspectives (first person, third person, top down), 2D game design, 3D game design, AI in gaming, storytelling, characters, danger, rewards, history of gaming, rating system, storyboarding

Course Outcomes: At the completion of this course students will be able to:

1. Write programs that make computers follow instructions to create games
2. Write code that makes decisions, choosing between multiple options
3. Write code that loops, repeating instructions until certain outcomes are reached
4. Organize their code to be more efficient and useful
5. Use functions to write multiple sections of code that communicate with each other |

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Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Computer Programming 1	3x/week @ 50min each Semester	Python	**Coding Concepts:** intro to python, variables, input/output, comments, variable types, numbers, converting, concatenation, math, modulus, strings, string methods, lists, if statements, conditionals, for loops, functions, while loops, nested loops

CS Concepts: computer parts, types of softwares, file systems, flow charts, algorithms, network topologies, OSI model, troubleshooting, digital citizenship, CIA triad, digital privacy, cybersecurity, ethics in innovations, cyber bullying, the digital divide, simulations, history of computer science, software engineering teams, apps, system models, testing strategies, software development strategies, artificial learning, machine learning, collecting & organizing data

Course Outcomes: At the completion of this course students will be able to:

1. Write programs that make computers follow instructions (in preparation for the certification)
2. Write code that makes decisions, choosing between multiple options
3. Write code that loops, repeating instructions until certain outcomes are reached
4. Organize their code to be more efficient and useful
5. Use functions to write multiple sections of code that communicate with each other

GRADE 9-11

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Web Development 1	3x/week @ 50min each Semester	HTML/CSS	**Coding Concepts:** HTML basics, heading tags, text colors, fonts, HTML structure, HTML as a language, background color, paragraphs, lists, images, buttons, videos, image link, intro to CSS, external style sheet, text shadow, rounded corners, box shadow, color gradient, comments, classes, color picker, box model, margin & padding, pseudo selectors, opacity, div tags, button design, list style, CSS icons, borders, positioning, tables, forms **CS Concepts:** career exploration, digital citizenship, the internet, ethics, acceptable use, cybersecurity, portfolios, file setup, color theory, typography, semantic tags, special characters, wireframes, accessibility, formatting, best practices, image editing, formatting, design tips, optimizing images for the web, responsive design **Course Outcomes:** At the completion of this course students will be able to: 1. Build web pages using best practices 2. Choose between different approaches for the most efficient code 3. Build web pages that are intuitive to use and utilize effective design strategies

GRADE 10-12

Course	Frequency	Coding Method of Teaching	Proposed Curriculum
Computer Programming 2	3x/week @ 50min each Semester	Python	**Coding Concepts:** string methods, lists, for loops, functions, parameters, while loops, if statements in loops, manipulating lists, generator and lambda functions, dictionaries, looping through a dictionary, tuples, sets, reading files, writing to files, nested loops, math library, DateTime library, object oriented programming, super classes, recursion **CS Concepts:** programming languages, history of computer science, copyright, passwords, computer innovations, members of a software team, bubble sort, insertion sort, selection sort, merge sort, resume, career exploration **Course Outcomes:** At the completion of this course students will be able to: 1. Write advanced programs for computers to execute a task 2. Write code that makes manipulates groupings of data 3. Write code that loops and iterate through the loops 4. Create object oriented programming projects 5. Explore different sorting techniques
Web Development 2	3x/week @ 50min each Semester	HTML CSS JavaScript	**Coding Concepts:** external style sheet, classes, pseudo selectors, media queries, bootstrap, grid, flexbox, jumbotron, cards, carousels, nav bar, dropdown, custom HTML elements, Facebook plugins, shadow DOM, animations, transform, transition, forms, intro to jQuery, getElementbyId, InnerHTML, JavaScript intro, console log, alerts, prompts, concatenation, math, functions, parameters, API's **Course Outcomes:** At the completion of this course students will be able to: 1. Build advanced web pages using best practices 2. Choose between different approaches for the most efficient code 3. Build web pages according to effective design principles 4. Add basic functionality to web pages using JavaScript

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