



4th Grade Massachusetts Digital Literacy and Computer Science Course Syllabus

One Year for Elementary School, 36 Hours

Course Overview and Goals

The 4th Grade Massachusetts Digital Literacy and Computer Science course introduces students to foundational programming concepts through a block-based programming language. Students will develop computational thinking and problem-solving skills while learning to create interactive projects, animations, and games. This course emphasizes creativity and collaboration, providing students with a solid base in computer science concepts and digital literacy.

Learning Environment: This course is teacher-led and includes ready-to-use lessons following a consistent structure: Introduction, Guided Practice, Independent Practice, Extension, and Reflection. Instruction follows an “I do, we do, you do” model and incorporates spiral review to reinforce concepts and build confidence over time. The course includes 36 lessons, each approximately 45 minutes long, providing a full year of instruction when taught once per week. While the course allows for instructional flexibility, some lessons are required to fully meet state computer science standards and are clearly identified within the syllabus. All Digital Literacy lessons are required to ensure full standards alignment, as they address essential non-programming computer science concepts. Required lessons are labeled with the specific standards they address to support planning and compliance.

Standards Alignment Note: Lessons that list “*Standards Met*” (below) are required to fully meet state computer science standards. Lessons without a standards tag support spiral review, practice, or enrichment.

Programming Environment: Students will write and run programs that are saved in students’ accounts. The environment supports interactive, hands-on programming, enabling students to create and debug projects in a user-friendly interface.

Assessments: Some units conclude with a brief 5 question quiz designed to assess student understanding of the concepts and skills introduced in the unit. Quizzes can be assigned digitally, completed as a QuizBuzz activity, or printed for paper-based completion.

Prerequisites: There are no prerequisites for this course. It is designed to support all learners, regardless of prior computer science experience.

More Information: Browse the content of this course at <https://codehs.com/course/28649/overview>



A clickable PDF can be found at https://codehs.com/MA_Roadmaps

Course Breakdown

Optional Review

Reviews CodeHop basics, vocabulary, drawing tools, and computational thinking for students who need extra practice before starting 4th grade content.

Objectives / Topics Covered	- Review CodeHop basics and vocabulary - Review computational thinking concepts
Lessons	Welcome to CodeHop! - Log in and use the CodeHop Playground. Introduction to Computer Science - Define important computer science vocabulary and create a simple program. Drawing Tools: Sea Creatures - Use CodeHop's image editing tools to create and program deep-sea creatures. Computational Thinking: Design a School - Use computational thinking to design a school.

Unit 1: Sequences & Events (2 lessons)

Introduces pair programming as students collaborate to design and code an interactive band.

Objectives / Topics Covered	- Collaborate through pair programming - Use keyboard inputs to control a program
Lessons	Pair Programming: Create a Band (3-5.CT.d.1; note: 2 classes) Collaborate through pair programming to design and code a band using keyboard inputs.

Unit 2: Loops & Conditionals (2 lessons)

Builds debugging skills and introduces game effects based on peer feedback.

Objectives / Topics Covered	- Debug a program using decomposition - Modify a game based on peer feedback
Lessons	Debugging: Mazes (3-5.CT.b.5, 3-5.CT.d.3) - Decompose a program to debug and make it run as intended. Game Effects (3-5.CT.b.3) - Modify a game to add engaging effects and make updates based on peer feedback. 4th Grade Sequences, Events, Loops & Conditionals Quiz (5 questions)

Unit 3: Variables & Lists (2 lessons)

Introduces variables through an interactive Pong game project.

Objectives / Topics Covered	Create and use variables to track score
Lessons	Pong Game (2 classes 3-5.CT.d.4) Create and use variables to keep score in an interactive pong game.

Unit 4: Story-Based Quest (4 lessons)

A four-part story-driven skill review with Scout that revisits functions, variables, and conditionals.

Objectives / Topics Covered	● Create functions with boolean and number inputs ● Use variables to track points ● Use if/then conditionals in a program
Lessons	Scout's Quest: Functions with Boolean Inputs ● Create a function with a boolean input to perform different actions based on whether a password is correct. Scout's Quest: Variables (3-5.CT.d.4) ● Create and use variables to track points in a program. Scout's Quest: Functions with Number Inputs ● Create a drawing using functions with number inputs. Scout's Quest: Conditionals (3-5.CT.d.2) ● Create a program using if/then conditionals. 4th Grade Variables, Lists & Story-Based Quest Quiz (5 questions)

Unit 5: Culmination Project (2 lessons)

A culminating project where students apply design thinking to improve accessibility in a game.

Objectives / Topics Covered	● Use design thinking to solve a real-world problem ● Improve accessibility and usability in a program
Lessons	Designing Solutions for Accessibility (2 classes 3-5.CAS.c.6, 3-5.CS.b.2, 3-5.CT.a.3) ● Use the design thinking process to redesign a game to improve accessibility and usability for diverse users.

Unit 6: Computing Systems (3 lessons)

Explores computing systems, networks, and productivity software tools for organizing and presenting research.

Objectives / Topics Covered	● Identify computer hardware and software ● Explain how networks and packets connect devices ● Use productivity software to present research
Lessons	Developing Keyboard Skills ● Use proper finger placement to practice typing paragraphs. Exploring Computing Systems (3-5.CS.a.1, 3-5.CS.a.2, 3-5.CS.a.4, 3-5.CS.a.5) ● Identify parts of the computing system and identify simple hardware and software problems. Networks, Packets, and the Internet (3-5.CS.c.1, 3-5.CS.c.4) ● Identify and compare wired and wireless network connections and model how devices communicate using packets. Productivity Software Inquiry Project (2 classes 3-5.DTC.a.2, 3-5.DTC.a.3) ● Use document, spreadsheet, and presentation software to organize research and present information. 4th Grade Computing Systems Quiz (5 questions)

Unit 7: Safety & Responsibility (7 lessons)

Introduces online safety, digital footprints, cyberbullying, digital collaboration, and cryptography.

Objectives / Topics Covered	● Attribute sources found online ● Practice secure online habits ● Manage a digital footprint responsibly
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	Recognize and respond to cyberbullying
Lessons	Give Credit When You Use It (3-5.DTC.c.1, 3-5.DTC.c.2, 3-5.DTC.c.3, 3-5.DTC.c.4, 3-5.CAS.b.4, 3-5.DTC.c.6) - Search for information online and provide proper attribution to sources. Online Risks & Protection (3-5.CAS.a.2, 3-5.CAS.a.4, 3-5.CAS.a.5) - Practice secure online habits and understand tools that protect personal information. Managing Digital Footprints (3-5.CAS.a.3, 3-5.CAS.b.1) - Explain how online actions create digital footprints and describe how to manage a digital identity responsibly. Exploring Digital Etiquette and Communication (3-5.CAS.a.3) - Demonstrate proper digital etiquette when communicating in an online community. Standing Up to Cyberbullying (3-5.CAS.a.6, 3-5.CAS.a.7, 3-5.CAS.c.7) - Recognize types of online hurtful behavior, including cyberbullying, and describe ways to respond. Exploring Digital Collaboration (3-5.DTC.b.1, 3-5.DTC.b.2) - Collaborate with others digitally to complete a program that solves a community problem. Exploring Cryptography (3-5.CT.a.1) - Model and explain cryptography by encrypting and decrypting messages using Atbash, Caesar, and student-created ciphers. 4th Grade Safety & Responsibility Quiz (5 questions)

Unit 8: Data & Analysis (5 lessons)

Introduces the inquiry process, spreadsheets, and evaluating data for reliability.

Objectives / Topics Covered	- Follow the inquiry process to investigate a question - Organize data using spreadsheet software - Evaluate data for reliability
Lessons	Inquiry Project: Data Bar Graph (3-5.DTC.c.5) - Follow the inquiry process and modify a program to display investigation results. Programming and Data Project (2 classes 3-5.CT.c.2) - Develop an investigative question, collect data, draw conclusions, and create an interactive program to present data visually. Introduction to Spreadsheets - Use spreadsheet software to organize and analyze data. Data Investigators (3-5.DTC.c.3, 3-5.CT.a.2) - Evaluate data for reliability, then analyze it to draw conclusions and make predictions. 4th Grade Data & Analysis Quiz (5 questions)

Unit 9: Impacts of Computing (4 lessons)

Explores how technology affects jobs and the environment, careers in sports analytics, and computer science innovators.

Objectives / Topics Covered	- Explain how technology and culture influence each other - Connect coding to careers in sports - Research a computer science innovator
Lessons	Impacts of Computing: Exploration (3-5.CAS.c.4) - Explain how technology and culture influence each other and investigate how technology changes jobs and affects the Earth. Careers in CS: Major League Baseball - Explain how coding is used in sports and retell events from an article in a timeline program. CS Innovators Research Project (2 classes)

	Research an innovator and use facts from an article to create an informational program. 4th Grade Impacts of Computing Quiz (5 questions)
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Unit 10: AI Exploration (3 lessons)

Introduces emerging technologies, machine learning approaches, and how training data affects an AI model's predictions.

Objectives / Topics Covered	- Explain why people design new technology - Describe machine learning approaches - Analyze how training data affects AI predictions
Lessons	Creating Smart Machines (3-5.CS.b.1, 3-5.CS.b.3, 3-5.CS.d.1) - Describe how emerging technologies are used and why people design and build new technology. How Machines Learn (3-5.CS.b.1, 3-5.CT.e.1, 3-5.CT.e.2) - Explain different machine learning approaches and modify a program to model how AI can be trained to make predictions. Machine Learning: Training (3-5.CT.e.3) - Analyze how training data affects an AI model's predictions and train a model using Teachable Machine. 4th Grade AI Exploration Quiz (5 questions)

4th Grade Massachusetts Digital Literacy and Computer Science Supplemental Materials

Resources	Description
Parent Welcome Letter (Spanish)	Send this letter home to introduce families to their new computer science curriculum.
Warm-Up Activities	This warm-up activity slide deck provides 5-10 minute problems aligned with computer science skills to engage students at the start of class, allowing teachers to preview or review concepts with answer keys and discussion tips included in the Speaker Notes.
Program Self-Assessment (Spanish)	This is a student self-assessment tool designed to help K-6 learners reflect on their programming projects, evaluate their skills in algorithms, debugging, collaboration, and reflection, and set goals for improvement.
Peer Review Resources (Spanish)	This provides structured worksheets to facilitate student feedback during collaborative coding projects. It encourages reflection by guiding students to highlight successes, ask questions, and offer constructive feedback on their partner's work.
Lesson Reflection & Computational Thinking (Spanish)	This guides students in engaging with computational thinking concepts, preparing for discussions, reflecting on lessons, and applying their learning to real-world problem-solving.
Design-Your-Own-Lesson Templates	Empower your students to explore and express their knowledge creatively with our versatile graphic organizer templates. Designed with adaptability and ease of use in mind, these interactive tools transform any subject into an engaging,

	hands-on learning experience.
These resources and more are found on the CodeHop Resources Page .	