5th Grade Computer Science Course Syllabus

One Year for Elementary School, 36 Hours

Course Overview and Goals

The 5th Grade 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.

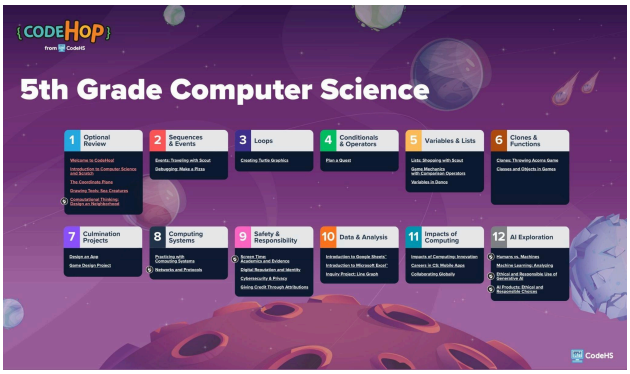
The course includes 36 lessons, each approximately 45 minutes long, providing a full year of instruction when taught once per week. While the course allows for instructional flexibility, some lessons are required to fully meet CSTA computer science standards and are clearly identified within the syllabus.

Standards Alignment Note: Lessons that list standards in parentheses next to the title are required to fully meet CSTA 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.

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/28417/overview



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

Course Breakdown

Unit 1: Optional Review (5 lessons)

These optional lessons are available for review at the start of 5th grade. They are not counted toward the 36-lesson course total.

Objectives / Topics Covered	● Review foundational programming and computational thinking concepts. ● Revisit sequences, events, loops, and the CodeHop interface. ● Build confidence before beginning new 5th grade content.
Lessons	**Welcome to CodeHop!** ● Learn how to log in and use the CodeHop Playground. This short introductory lesson can be used on its own, or right before a full lesson. **Introduction to Computer Science** ● Define important computer science vocabulary and create a simple program. **The Coordinate Plane** ● Create an open-ended animation using the coordinate plane. **Drawing Tools: Sea Creatures** ● Use all of the CodeHop image editing tools to create and program deep sea creatures. **Computational Thinking: Design a Neighborhood (Unplugged)** ● Use computational thinking to design a neighborhood.

Unit 2: Sequences & Events (2 lessons)

In this module, students revisit sequences and events through new creative contexts, a travel adventure, and a debugging challenge.

Objectives / Topics Covered	● Use events and sequences to build an interactive travel story. ● Identify and fix errors in a CodeHop program using systematic debugging strategies.
Lessons	**Events: Traveling with Scout** ● Use events in a program. **Debugging: Make a Pizza** (E5-PRO-TR-08) ● Decompose a program to debug and make the program run as intended.

Unit 3: Loops (1 lesson)

In this module, students use loops to create turtle graphics, drawing geometric shapes and patterns by repeating directional drawing commands.

Objectives / Topics Covered	● Use loops and drawing commands to create geometric turtle graphics.
Lessons	**Creating Turtle Graphics** ● Use the pen tool in the program to create looping turtle graphics.

Unit 4: Conditionals & Operators (1 lessons)

In this module, students apply conditionals and operators to design and build an interactive quest adventure.

Objectives / Topics Covered	● Use conditionals and Boolean operators to create branching logic in a program. ● Plan and implement an interactive multi-path quest.
Lessons	**Plan a Quest** (2 classes | E5-ALG-PS-01, E5-PRO-RD-07) ● Plan and decompose the steps needed to create a quest program.

Unit 5: Variables & Lists (3 lessons)

In this module, students apply variables and lists in a variety of game and animation contexts.

Objectives / Topics Covered	● Use lists to store and access collections of data in programs. ● Apply comparison operators and variables to control game mechanics. ● Use variables to manage data and behavior in animations and games.
Lessons	**Lists: Shopping with Scout** (2 classes | E5-PRO-VD-06) ● Create a shopping simulator using variables, lists, and operators. **Game Mechanics with Comparison Operators** (E5-PRO-VD-06) ● Use comparison operators and variables to create ending game mechanics. **Variables in Dance** (E5-PRO-VD-06) ● Use variables to control pitch and dance speeds in a program.

Unit 6: Clones & Functions (2 lessons)

In this module, students explore cloning and object-oriented thinking in CodeHop, using clones to create multiple sprite instances and applying class-based thinking to build game code.

Objectives / Topics Covered	● Use clones to create multiple instances of a sprite in a program. ● Apply class and object concepts to organize and build a complex game.
Lessons	**Clones: Throwing Acorns Game** ● Create a throwing acorns game using clones. **Classes and Objects in Games** (2 classes | E5-PRO-VD-06) ● Learn about classes and objects in programming while they create an interactive game and use randomizers to change the characteristics of objects.

Unit 7: Culmination Projects (2 lessons)

In this module, students apply all programming skills from the year in two major capstone projects: a fully designed app and a complete original game.

Objectives / Topics Covered	● Apply the full design process to plan and build an app that addresses a real-world need. ● Design and create a complete, original game using all major programming concepts.
Lessons	**Design an App** (3 classes | E5-ALG-IM-03, E5-PRO-RD-07, E5-SOC-HI-16, E5-SOC-HU-18) ● Use the design thinking process to design an app that helps to solve a user's need. **Game Design Project** (3 classes | E5-PRO-PD-04) ● Use the design thinking process to design an app that helps to solve a user's need.

Unit 8: Computing Systems (2 lessons)

In this module, students examine how computing systems are built and how networks operate using protocols.

Objectives / Topics Covered	● Identify and describe how hardware and software interact within a computing system. ● Explain what network protocols are and how they govern data transmission.
Lessons	**Practicing with Computing Systems** (E5-SYS-HW-12) ● Identify parts of the computing system and identify simple hardware and software problems. **Networks and Protocols (Unplugged)** (E5-SYS-NT-14) ● Identify parts of the computing system and identify simple hardware and software problems.

Unit 9: Safety & Responsibility (4 lessons)

In this module, students explore screen time balance, digital identity, cybersecurity, and attribution.

Objectives / Topics Covered	● Evaluate screen time habits using evidence and academic research. ● Understand how online behavior shapes a digital reputation and identity. ● Identify cybersecurity threats and privacy risks and apply protective strategies. ● Apply proper attribution when using others' work in digital projects.
Lessons	**Screen Time: Academics and Evidence** (E5-SOC-ET-17) ● Explain how screen time affects their learning and study habits, create a healthy screen-time plan, and write an opinion about the most important screen-time rule and support it with reasons. **Digital Reputation and Identity** (E5-DAT-IM-11) ● Analyze how online actions affect digital reputation and explain how to protect personal data and digital security. **Cybersecurity & Privacy** (2 classes | E5-SYS-SE-13) ● Create an animated program to demonstrate how to solve a real-world cybersecurity issue. **Giving Credit Through Attributions** (E5-PRO-PD-04) ● Give appropriate attribution when creating or remixing programs online.

Unit 10: Data & Analysis (2 lessons)

In this module, students collect, organize, and visualize data using spreadsheet tools and inquiry-based research.

Objectives / Topics Covered	● Use spreadsheet software to organize, analyze, and visualize data. ● Conduct an inquiry project and present findings using a line graph. ● Interpret data visualizations to draw meaningful conclusions.
Lessons	**Introduction to Google Sheets**™ (E5-DAT-DC-09) ● Enter, organize, and visualize data in a spreadsheet. **Introduction to Microsoft Excel**™ (alternative lesson | E5-DAT-DC-09) ● Enter, organize, and visualize data in a spreadsheet. **Inquiry Project: Line Graph** (2 classes | E5-DAT-DI-10) ● Follow the inquiry process and modify a program to display the results of their investigation.

Unit 11: Impacts of Computing (3 lessons)

In this module, students examine how computing drives innovation and global collaboration, exploring careers in mobile app development.

Objectives / Topics Covered	● Describe how computing innovation has transformed industries and daily life. ● Explore careers in mobile app development. ● Collaborate on a global project that applies computing skills to shared challenges.
Lessons	**Impacts of Computing: Innovation** (E5-SYS-IM-15, E5-SOC-HI-16) ● Explain how technology and culture influence each other and create a project that compares past and present versions of a technology, explains its cultural impacts, and predicts how emerging technologies may affect different communities. **Careers in CS: Mobile Apps** (E5-SOC-CE-19) ● Analyze and improve a game by modifying code and adding new functionality. **Collaborating Globally** (2 classes | E5-PRO-PD-05, E5-SOC-CE-19) ● Analyze and improve a game by modifying code and adding new functionality.

Unit 12: AI Exploration (4 lessons)

In this module, students examine AI capabilities and limitations, analyze machine learning models, and explore ethical considerations of generative AI.

Objectives / Topics Covered	● Compare human and machine decision-making to understand AI capabilities and limits. ● Analyze a trained machine learning model to evaluate its performance. ● Apply ethical frameworks to evaluate the responsible use of generative AI. ● Assess AI products for ethical design and responsible use considerations.
Lessons	**Humans vs. Machines (Unplugged)** (E5-SOC-HU-18) ● Compare and contrast human and computer performance on similar tasks, explain the advantages and limitations of technology, and describe computer perception. **Machine Learning: Analyzing** (E5-ALG-ML-02) ● Train and interact with an AI model using Teachable Machine and analyze the relationships between the properties of training data and an AI model's output. **Ethical and Responsible Use of Generative AI (Unplugged)** (E5-SOC-ET-17) ● Describe the pros and cons of generative AI and complete a class Code of Conduct to follow when using AI. **AI Products: Ethical and Responsible Choices** (E5-ALG-IM-03, E5-DAT-IM-11, E5-SOC-ET-17) ● Describe how AI products work and analyze the benefits and challenges of various AI products from multiple perspectives.

5th Grade Course 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**.	