Code HS Computer Science Explorations 1 Curriculum Overview Tables

1 - Karel Adventures 1- basics of JavaScript

Foundational Programming Concepts:	Syntax: Understanding the structure and rules of coding. Debugging: Learning to identify and fix errors in code. Problem Solving: Developing skills to solve programming challenges
Engaging Learning Environment:	Adventure Stories: Integrating narrative elements to make the learning experience more enjoyable. Visual Representation: Using a dog character (Karel) and scenarios to visualize programming concepts.
Control Structures:	If Statements: Conditional execution based on true/false conditions. While Loops: Repeating code as long as a certain condition is true. If/Else Statements: Providing alternative paths based on conditions. Multiple Control Structures: Understanding when and how to use different structures
Project-Based Assessment:	Evaluation: Applying learned concepts in a practical setting through quizzes and projects. Application: Testing students' ability to use if statements, while loops, and sequences of commands.
Building Complexity:	Progression: Moving from basic syntax to more advanced concepts like if/else statements, while loops, and multiple control structures. Problem Complexity: Solving more complex problems as students advance through the adventures.
Logical Thinking:	Sequence of Commands: Developing logical thinking by arranging commands to achieve specific tasks. Decision-Making: Deciding which control structures to use for solving different problems
Coding Environment Familiarization:	Introduction to the CodeHS editor: Acquainting students with the coding environment
Reflective Learning:	Debugging Strategies: Teaching students to reflect on and troubleshoot their own code. Evaluation: Encouraging students to consolidate their learning through quizzes and projects

2 - Karel Adventures 2 - JavaScript

Continuation of Foundational Concepts:	Syntax and Coding: Further exploration and application of JavaScript syntax. Debugging: Building on debugging skills to identify and resolve issues in programs.

Advanced Control Structures:	If/Else and Nested If Statements: Handling multiple conditions and nested decision-making. While Loops: Continuing to use loops for repetitive tasks. For Loops: Introducing a new control structure for a specific number of iterations.
Problem-Solving in Context:	Real-World Scenarios: Solving problems within the context of adventure stories. Choosing Control Structures: Decision-making on which control structures are most suitable for given challenges.
Functions and Decomposition:	Function Definition and Calling: Introducing modular programming through functions. Top-Down Decomposition: Breaking down complex problems into manageable parts for systematic problem-solving.
Efficient Programming:	Program Control Statements: Emphasizing the importance of writing efficient and effective programs. Clear and Readable Code: Encouraging students to write code that is easy to understand.
Visual Elements and Creativity:	Custom Colors: Using visual elements to enhance the coding experience. Scene Creation: Applying coding skills to create visual scenes in Karel.
Project-Based Learning and Evaluation:	Application of Knowledge: Testing learned concepts through the completion of adventures. End-of-Unit Evaluation: Assessing students through quizzes and projects.
Logical Thinking and Decision-Making:	Complex Problem Solving: Providing challenges that require careful consideration of multiple factors. Control Structure Selection: Encouraging students to choose the most appropriate control structures for given tasks.
Engaging Narrative:	Adventure Stories: Continuing to use storytelling to make the learning experience engaging and relatable.
Progression in Complexity:	Advancing from the basics to more complex programming concepts and challenges.

3 - Exploring Computing

Historical Evolution and Impact:	Understanding the historical development of computers. Analyzing the profound impact of computing on everyday life.
Software and Application Development:	Exploring different types of software, including operating systems and applications. Understanding the process of developing applications.
Hardware and Troubleshooting:	Identifying and comprehending various computer hardware components. Applying hardware knowledge to troubleshoot common computer issues.

Advanced Computing Concepts:	Introducing advanced concepts like cloud computing and its benefits. Examining the Internet of Things (IoT) and addressing privacy concerns.
Ethics, Bias, and Legal Considerations:	Exploring ethical considerations and legal aspects in computing. Understanding how bias can be minimized in computing technologies
Future Trends and Opportunities:	Investigating current and future trends in the computer industry. Exploring diverse roles and opportunities for students in the computing field.
Project-Based Learning:	Engaging in a project to design the computer of the future. Critiquing and evaluating others' designs for future computers.
Assessment and Summative Evaluation:	Demonstrating knowledge through a summative quiz that covers past, present, and future aspects of computing

4 - Tracy Adventures

Storytelling and Adventure:	Engaging students with storytelling adventures to make learning more interactive. Integrating story backgrounds, commands, and concepts to reinforce learning.
Progression and Cumulative Learning:	Building upon foundational concepts in each adventure story. Gradually introducing more advanced commands, functions, and programming techniques.
Application and Creativity:	Encouraging creativity through the application of artistic effects in programs. Allowing students to design programs that reflect their understanding of Tracy's commands and programming concepts.
Problem-Solving and Debugging:	Emphasizing the importance of debugging skills through error messages. Integrating problem-solving tasks within the context of adventure stories

5 - Exploring Digital Citizenship

Responsible Online Behavior:	Encouraging responsible and ethical behavior in the online environment.
Empowerment Through Education:	Empowering students to protect themselves and others through knowledge and awareness.
Real-world Application:	Applying digital citizenship principles to create a public service announcement for community education.

Critical Thinking:	Encouraging critical thinking in evaluating online information and making informed decisions.
Digital Literacy:	Developing digital literacy skills for effective and safe online engagement.
Community Engagement:	Connecting digital citizenship education with community awareness and education.

Karel Adventures 1 - Students learn the basics of JavaScript Programming (Syntax, coding, debugging, problem solving) as they follow Karel the Dog on two fun-filled adventures. Recommended for early middle school.		
1.1 Karel's Coding Environment	students will meet Karel the dog and explore the syntax of Karel's commands. Students will then tour the CodeHS editor and write their first Karel programs.	• Define syntax and why it is important in text coding • Use the Karel commands to write a simple Karel program
1.2 Karel Error Messages	students learn how error messages can give information on any issues, or bugs, that exist in their programs. They learn how to use these messages to debug their own code.	• Define what a bug is in programming • Describe the steps to debug a program • Use error messages to find and fix bugs in their programs
1.3 The Rabbit Chase	students go through their first Karel Adventure story! The lesson structure has students watch a video that tells part of a story and then complete a programming task that is aligned with the action of the story. They will repeat this process throughout the lesson. In this story, students will help Karel catch Riley the Rabbit.	• Write a sequence of commands to accomplish a specified task • Use Karel commands using the proper syntax • Use debugging strategies to find and fix errors in their programs
1.4 Lost in Space	students go through their second Karel Adventure story! In this story, students will help Karel travel to Mars to find her friend Tracy. Along the way, students will learn about if/else statements and while loops.	• Use if statements to run code if a specific condition is true • Use if/else statements to run code if a specific condition is either true or false • Use a while loop in their program to repeat code as long as a condition is true • Create programs that use multiple control structures • Decide which control structures to use to solve a complex problem
1.5 Karel Adventures 1: Evaluation	students put together all they've learned throughout this module to complete an end of unit quiz and/or project. These items can be used in whatever way you feel will benefit you and your students.	• Use if statements and while loops correctly in a program • Use a sequence of commands to complete a specific task

		• Determine when to use a specific control structure (if statement or while loop)
Karel Adventures 2 - Students learn the basics of JavaScript (control structures, problem-solving, functions, decomposition, visual elements) as they follow Karel the Dog on two fun-filled adventures.		
2.1 Quest for the Rosetta Stone	students go through their third Karel Adventure story! In this story, students will help Karel travel to Egypt to find the Rosetta Stone. Along the way, students will review if/else statements and while loops, and they will learn about for loops, nested if statements, and choosing the best control structure.	• Use if/else and if/else if/else statements to run code if a specific condition is either true or false • Use a nested if statement to check if multiple conditions are true • Use a while loop to repeat code as long as a condition is true • Use a for loop to repeat code a specific number of times • Create programs that use multiple control structures • Decide which control structures to use to solve a complex problem
2.2 A Day at the Park	students go through their fourth Karel Adventure story! In this story, students will help Karel get to the park to set up a scavenger hunt. Along the way, students will review if/else statements and loops, and they will learn about functions and top-down decomposition.	• Use program control statements to write efficient programs • Define and call functions • Utilize top-down decomposition to break problems into smaller, more manageable parts • Write programs that are clear and easy to follow • Use custom colors to create a scene in Karel
2.3 Karel Adventures 2: Evaluation		
Exploring Computing - Students explore different technologies and the impact they have on our world.		
3.1 History of Computing	Students will learn about the history of computers and how people have interacted with them over the decades.	• Describe the evolution of computers and how people have interacted with them. • Analyze the impact of computers on everyday life.

3.2 Software	students learn about different types of software, including operating systems and applications. They will also explore the process used to create an application.	• Explain the differences between operating systems and applications. • Describe the development process for creating an application.
3.3 Hardware	students will learn about different computer components and how they impact a computer system. They will then apply this to troubleshooting common computer issues.	• Identify the different hardware components of a computer system and explain their function. • Analyze and troubleshoot common computer issues.
3.4 Cloud Computing	students will learn what cloud computing is and compare and contrast it to physical computing	• Explain the concept of cloud computing and its benefits. • Compare and contrast cloud computing with physical computing
3.5 Internet of Things	students will learn about how the Internet of Things devices are all around us and how to manage privacy concerns related to these devices.	• Identify various examples of internet of things devices and how you interact with them daily. • Explain the importance of data privacy when using internet of things devices.
3.6 Ethics and Legal Considerations	students will learn about ethical and legal considerations in computing and how these can create bias	• Explain how bias can be prevented or minimized in computing. • Identify ethical and legal considerations when using computing technologies.
3.7 The Future of Computing	students will learn about where computing is going (including the impact of AI) and the roles that they can play in that future.	• Understand the current and future trends in the computer industry. • Examine the various roles and opportunities that students will have in the computing industry
3.8 Project: Design the Computer of Tomorrow	students will design a computer to meet the needs of the future and also review others' designs to assess how well they will meet these future needs.	• Identify and evaluate the components that are necessary for a computer to meet the needs of the future • Design and create a computer that meets the needs of the future • Critique and evaluate other designs of computers to assess how well they will meet the needs of the future.

3.9 Quiz: Exploring Computing	students will demonstrate what they learned in the unit be completing a summative exam.	• Prove their knowledge of Computers, past, present, and future, through a multiple-choice quiz
Tracy Adventures - Students will learn how to use basic commands, variables, and functions in their programs using the Python programming language. Recommended for early middle school. Programming		
4.1 Intro to Tracy's Grid World	students are introduced to Tracy the turtle and learn about the world she lives in and how to begin communicating with her. They refresh the concept of coordinate points on an x-y axis and practice using the goto command to send Tracy to different locations in her grid world.	• Describe the difference between block and text coding • Use coordinate points to describe locations on a grid • Use the goto command • Define and describe syntax
4.2 Debugging with Error Messages	students learn how error messages can give information on any issues, or bugs, that exist in their programs. They learn how to use these messages to debug their own code.	• Define what a bug is in programming • Describe the steps taken to debug a program • Use error messages to get information about where bugs exist in their code and how to fix them

4.3 A Day at the Carnival	students go through their first Tracy Adventure story! They will be given a bit of story background, learn any needed commands or concepts, and apply these to complete a task. They will repeat this process throughout the module.
	In this story, students will help Tracy through a day at the carnival and will learn basic Tracy commands, how to call and define functions, and some commands that will add artistic effects to their programs.
	This story should take 2-3 hours for students to complete.
		Create programs using the following commands:
		   ○ goto
		   ○ circle
		   ○ penup & pendown
		   ○ begin_fill & end_fill
		   ○ color
		   ○ forward
		• Define and call functions in their programs

4.4 Under the Sea	students go through their second Tracy Adventure story. As in the prior lesson, they will be given a bit of story background, learn any needed commands or concepts, and apply these to complete a task. They will repeat this process throughout the module.	• Create programs using the following commands:
		
		   ○ bgcolor
		   ○ pensize
		   ○ circle with amount parameter

	In this story, students will help Tracy through an underseas adventure to find her cousin, the sea turtle, and will learn how to use variables, parameters, and user input in their programs.
	This story should take approximately 2-3 hours for students to complete.
		○ color with hexcodes
		    ○ left & right
		    ○ input
		    ○ int - Assign and utilize variables in their programs - Define and call functions that take parameters - Ask for and utilize text and numeric user input in their programs

4.5 Tracy Adventures 1: Evaluation	students put together all they've learned throughout this module to complete an end of unit quiz and/or project. These items can be used in whatever way you feel will benefit you and your students.	demonstrate the knowledge they have acquired throughout this module through a quiz and/or project
Exploring Digital Citizenship - Students learn about Internet etiquette and how to stay safe on the world wide web.		
5.1 Digital Footprint and Reputation	students understand how they can control and protect their footprint. As students use the Internet, they are building their digital footprint. This includes social media posts, emails, picture and video uploads amongst other online activity.	- Understand how their online activity contributes to a permanent and public digital footprint - Articulate their own social media guidelines to protect their digital footprint
5.2 Cyberbullying	students will learn about and discuss cyberbullying. Cyberbullying is the use of electronic communication to harass or target someone. Cyberbullying includes sending, posting, or sharing negative, harmful, false, or mean content about someone else.	- Understand the impact of cyberbullying, and identify unacceptable bullying behavior - Identify proper actions to take if they are victims of cyberbullying or if they observe someone being cyberbullied
5.3 Internet Safety	students will learn to recognize online predatory behavior and strategies on how to avoid and respond to it. The Internet is a great place to socialize, but it is important to be aware of risks. Common sense and following safety guidelines can help students stay safe online.	Identify predatory behavior and how to respond to it online

5.4 Privacy & Security	students will discuss and examine policies regarding privacy and security. Using best practices like setting strong passwords, reading privacy policies, and using https can help in staying safe online.	• Use best practices in personal privacy and security, including strong passwords, using https, and reading privacy policies
5.5 Information Literacy	students will learn about and discuss information literacy. Information literacy is having the ability to find information, evaluate information credibility, and use information effectively	• Effectively search for and evaluate resources
5.6 Creative Credit & Copyright	students will learn what copyright laws are and how to avoid copyright infringement. They will explore why copyright laws are important and how they protect the creators.	• Explain what copyright laws are and why they are important • Find images they are legally allowed to use in their projects • Accurately attribute images they find and want to use
5.7 Hacking Ethics	students will explore and discuss the ethics and legality around hacking. A security hacker is someone who seeks to break through defenses and exploit weaknesses in a computer system or network. There are white hat hackers, who help companies find and protect exploits in their systems, and black hat hackers who hack maliciously.	• Identify the difference between white hat hacking and black hat hacking • Explain career opportunities in cybersecurity
5.8 Project: Public Service Announcement	students have learned about digital citizenship and cyber hygiene, they will take what they have learned and create a PSA to inform members in the community about a topic!	• Create a public service announcement for members of their community about a topic in digital citizenship or cyber hygiene • Use google sheets to store and analyze data, and create a data visualization.
5.9 Digital Citizenship and Cyber Hygiene Quiz	students complete a summative assessment of the unit's learning objectives	• Prove their knowledge of digital citizenship and cyber hygiene concepts through a multiple choice quiz