CodeHS

New York Computer Science 7-8

1 Semester for Middle School (50-60 contact hours)

Course Overview and Goals

New York Computer Science 7-8 is fully aligned to the New York State Computer Science and Digital Fluency Learning Standards for students in grades 7 through 8. Students will learn concepts in the framework including: Impacts of Computing, Computational Thinking, Networks & System Design, Cybersecurity, and Digital Literacy.

Learning Environment: The course utilizes a blended classroom approach. The content is fully web-based, with students writing and running code in the browser. Teachers utilize tools and resources provided by CodeHS to leverage time in the classroom and give focused 1-on-1 attention to students. Each unit of the course is broken down into lessons. Lessons consist of video tutorials, short quizzes, example programs to explore, and written programming exercises, adding up to over 100 hours of hands-on programming practice in total. Each unit ends with a comprehensive unit test and project that assesses student's mastery of the material from that unit.

Programming Environment: Students write and run programs in the browser using the CodeHS online editor. Students write text based programs using a modified JavaScript library with Karel and p5.js.

Prerequisites: The New York Computer Science 7-8 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/20480/overview

Course Breakdown

Module 1: Exploring Digital Citizenship (2 weeks/10-12 hours)
In this module, students learn about Internet etiquette and how to stay safe on the world wide web.

Browse the full content of this module at https://codehs.com/course/20480/explore/module/28323

Objectives / Topics Covered	• Digital Footprint and Reputation • Cyberbullying • Internet Safety • Privacy & Security • Information Literacy • Creative Credit & Copyright • Hacking Ethics

Example Assignments	• Build a Positive Digital Footprint
	  ○ Reflect on your social media activity. Give an example of a social media post that builds a positive digital footprint. Give an example of a social media post that builds a negative digital footprint.
	• Final Project: Create a Public Service Announcement
	  ○ Create a Public Service Announcement (PSA) to teach your peers about your selected topic in digital citizenship and cyber hygiene. You could make a video, song, poster, or slideshow.

Module 2: Exploring Programming with Karel (2 weeks/10-12 hours)
In this module, students learn the basics of programming by giving Karel the Dog commands in a grid world.

Browse the full content of this unit at https://codehs.com/course/20480/explore/module/28324

Objectives / Topics Covered	• Commands • Functions • Conditionals • Looping • Control Flow

Example Assignments	• Program-specific tasks for Karel the Dog
	  ○ Example Exercise: Tennis Ball Game Setup
	  Karel's getting ready to play a tennis ball game with friends at the dog park. Karel wants to hide 4 tennis balls around the dog park. Help Karel get the game setup by programming Karel to put one tennis ball on each of the purple squares around the dog park.
	• Teach Karel new commands like `turnRight()` or `makeStack()`
	  ○ Example Exercise: Tennis Ball Stacks
	  Karel is setting up stacks of tennis balls for a game with friends. The stacks of tennis balls need to be placed on the cement squares in the 2nd, 4th, and 6th columns. Each stack should have three tennis balls. Create a function called `makeStack()` to help Karel create the tennis ball stacks.
	• Using control structures and conditionals to solve general problems
	  ○ Example Exercise: Karel's Race
	  Your task is to get Karel to move around the racetrack eight times, and end up back in the starting position. Every time Karel hits a corner, Karel should put a ball down. Then at the end of the race there should be 8 balls on each corner.

Module 3: Exploring Computing (2 weeks/10-12 hours)
In this module, students explore different technologies and the impact they have on our world.

Browse the full content of this unit at https://codehs.com/course/20480/explore/module/28322

Objectives / Topics Covered	• History of Computing • Software • Hardware • Cloud Computing • Internet of Things • Ethics and Legal Considerations • The Future of Computing
Example Assignments	• Cloud Computing Reflection ○ For this activity, you are going to pretend to be in charge of a new start-up company that specializes in painting houses. Your company is small now but growing. As a small company, you want to have a web presence and you also need to manage job leads and billing. How could a cloud solution help you?

	● Final Project: Design the Computer of Tomorrow ○ How will you design a computer that can meet the future needs of users? Will your computer use the cloud? Will it use the Metaverse? ○ Accessibility means that it can be used by all users. Computers of today have accessibility features such as screen readers for the blind, alternate input devices, etc. What will you do to make sure everyone can access your computer?

Module 4: Exploring the Internet (2 week/10-12 hours)

In this module, students learn network protocols and different strategies used to protect online information.

Browse the full content of this unit at https://codehs.com/course/20480/explore/module/28321

Objectives / Topics Covered	● What is the Internet ● The Need for Protocols ● Impact of the Internet ● Cybersecurity ● The CIA Triad ● Encryption
Example Assignments	● Encrypt and Decrypt ○ Explore the following simulation to practice encrypting and decrypting a message using a key. Create a message to encrypt and decide on a key. The key can be a word or a number (or a combination). Do you think you'd be able to decode and crack this message without the key? ● Final Project: Steganography ○ In the following activity, you will see a picture and the corresponding color codes associated with the pixels. There is a message hidden in the first 12 pixels! Your mission will be to reverse the process and find the secret message!

Module 5: Exploring Art with Code (2 week/10-12 hours)

In this module, students explore the intersection of art and technology by creating sketches using p5.js.

Browse the full content of this unit at https://codehs.com/course/20480/explore/module/28372

Objectives / Topics Covered	● Color Theory ● Color Transitions ● Color Transformations ● Shape Transformations ● Direction ● Animation ● Interactivity
Example Assignments	● Final Project: Animate an Emoji ○ Create an animated sketch of an emoji. An emoji is a small icon used to represent an emotion, symbol, or object. Complete the project proposal to plan your sketch and then use drawing and color functions we have learned so far to create it using p5.js.