

Connecticut Computer Science: 6th Grade

Middle School (60 Contact Hours)

Course Overview and Goals

This Connecticut Computer Science: 6th Grade course is an introductory course where students learn the basics of programming with Karel the dog and Tracy the turtle, computing, and digital citizenship.

Learning Environment

The course utilizes a blended classroom approach. The content is a mix of web-based and physical activities. Each module of the course is broken down into lessons. Lessons are composed of short video tutorials, interactive learning pages, quizzes, explorations, and free-response prompts.

Prerequisites

The 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 those new to computer science.

More Information

Browse the content of this course at <https://codehs.com/course/25035/overview>

Course Breakdown

Module 1: Karel Adventures 1 (10 hours)

Students learn the basics of JavaScript as they follow Karel the Dog on two fun-filled adventures.

Browse the full content of this unit at <https://codehs.com/course/25035/explore/module/27401>

Topics Covered	● Sequencing ● Syntax ● Commands ● Debugging ● Conditionals ● Conditional Statements ● While loops
Example Assignments	● Debug #1

	○ In this program, Karel should move forward 4 times, but there are some errors. Use the error messages to help find and fix the bugs! ● Riley the Troublemaker ○ Protect the tennis balls from Riley the Rabbit (he's just a gray square in Karel's world) by building a wall around the bucket! ● Asteroid Field ○ It looks like there is an asteroid field in between Karel and Mars! Help Karel to destroy each asteroid. Program Karel to use if statements and conditions to paint each asteroid (orange square) black. ● Tracking Tracy ○ Tracy left a trail through the sand. Follow the trail to find Tracy! You can nest different code structures together by putting if statements, if/else statements, and while loops inside each other.
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Module 2: Karel Adventures 2 (10 hours)

Students learn the basics of JavaScript as they follow Karel the Dog on another fun-filled adventure.

Browse the full content of this unit at <https://codehs.com/course/25035/explore/module/27819>

Topics Covered	● Syntax ● Commands ● Conditional Statements ● Control Statements ● Functions ● Top-Down Decomposition ● Loops
Example Assignments	● Karel Clean Up ○ For this exercise, you are going to help Karel pick up all the dropped balls to take them to the park and hide them for the scavenger hunt. There are multiple Karel worlds of different sizes, so you will need to use a “while” loop to get you to the end, and inside the while loop you will need an “if” statement to pick up a ball if one is present. ● Find the Park ○ Karel needs to set up the scavenger hunt in the park. You need to help Karel navigate the city streets to make it to the park. Watch out for the cars (black squares)! Karel needs to go around these squares on the way to the park. Once at the park, Karel should grab the tennis ball and finish facing east. ● Making Custom Colors ○ For this activity, you are going to create 4 squares with custom colors. The first will be all red, the second all green, and the third all

	blue. The fourth color can be any color you choose! ● Collect the Tennis Balls ○ In this challenge, you will combine all of the coding skills you have learned with Karel to write a program that has Karel pick up all of the tennis balls. Your program should work in all three worlds.
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Module 3: Exploring Computing (10 hours)

Students explore different technologies and the impact they have on our world.

Browse the full content of this unit at <https://codehs.com/course/25035/explore/module/42346>

Objectives / Topics Covered	● History of Computing ● How Software Works ● Computer Hardware ● Cloud Computing ● Internet of Things ● Ethics and Legal Considerations ● Future of Computing ● Project: Design the Computer Device of Tomorrow
Example Assignments	● History of Computing ○ <i>Jigsaw: Computer Interaction Over the Decades:</i> In this activity, students are going to work in small groups to research what it was like to interact with computers over the various decades. For each section, students will want to consider what was typical for most computers. For example, GUI interfaces were first used in the 1970s, but they were not typical until the 1980s. ● Cloud Computing ○ <i>Case Study: Cloud Computing vs. Physical Computing:</i> Is cloud computing more efficient? Is physical computing the way to go? Students will read through a case study for a middle school that needs to decide between implementing a cloud computing solution or a physical computing solution. What are the pros and cons of each? Which way would you ultimately choose to implement?

Module 4: Tracy the Turtle Adventures (10 hours)

Students will learn how to use basic commands, variables, and functions in their programs using the Python programming language.

Browse the full content of this unit at <https://codehs.com/course/25035/explore/module/27513>

Topics Covered	● Intro to Tracy's Grid World ● Debugging with Error Messages
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	• Functions • Color • Effects • Size • Variables • Input/Output
Example Assignments	• A Day at the Carnival ◦ Students will help Tracy through a day at the carnival and will learn basic Tracy commands, how to call and define functions, and how to add artistic effects to their programs. • Stuffed Bear Prize ◦ You'll need to help finish drawing the bear before Tracy can bring it home. To finish the bear, fill in the commands that make up the function definitions by following the provided steps. • Shipwreck ◦ Direct Tracy through the shipwreck yard without running into any of the ships. Once she reaches the yellow star, she has made it out! The difference here, though, is that the ships will be located in random positions every time the program is run, so we'll need to use user input to direct Tracy through the shipwreck yard as the program is running. • Sea Turtle ◦ Get user input to tell Tracy where the tallest sea grass is so she can go meet a turtle and ask about her cousin.

Module 5: Exploring Digital Citizenship (10 hours)

Students learn about Internet etiquette and how to stay safe on the world wide web.

Browse the full content of this unit at <https://codehs.com/course/25035/explore/module/27863>

Objectives / Topics Covered	• Digital Footprint • Cyberbullying • Internet Safety • Privacy & Security • Information Literacy • Copyright • Hacking Ethics • Cyber Hygiene
Example Assignments	• Digital Footprint and Reputation ◦ <i>Building a Positive Digital Footprint:</i> Spend some time reflecting on you and your friends' social media activity. Give an example of a social media post that builds a positive digital footprint. How does

	the post build a positive digital footprint? Give an example of a social media post that builds a negative digital footprint. How does the post build a negative digital footprint? Thinking about your digital footprint, are you going to make any changes in what you post on social media? How about what you write to share in a group message? Why or why not? • Internet Safety ◦ <i>Scenario: School Stranger:</i> You begin to receive direct messages on Instagram from a person you don't recognize. They claim to go to your school, and they know a lot of information about your classes and teachers. They also follow a lot of your classmates, so you believe them. After a bit, they start asking questions about you and your friends. What steps should you take to respond to this situation? • Information Literacy ◦ <i>Evaluate the Source 1:</i> Take a look at this resource, and consider the following questions: What evidence do you see that this source is credible? What evidence do you see that makes you question the source's credibility? Is this a credible source?
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Module 6: Exploring Data and Spreadsheets (10 hours)

Students synthesize all they've learned in this course to complete a project where they use a device to collect and analyze data to find an answer to a question they have.

Browse the full content of this unit at <https://codehs.com/course/25035/explore/module/34325>

Topics Covered	• Data as a Resource • Using Databases • Introduction to Spreadsheets • Sort and Filter • Statistical Measures • Models • Visualizing Data
Example Assignments	• Sort and Filter ◦ <i>Influential Women:</i> In this exercise, students will learn about remarkable women who have made significant contributions in fields like Science, Literature, and Environmentalism, while having the opportunity to sort and filter data to uncover interesting facts and connections about these inspiring figures. • Statistical Measures ◦ <i>Mammal Statistics:</i> In this exercise, students will explore data on common mammals while calculating the mean, median, and mode of various data points to derive meaningful insights. • Visualizing Data

	○ <i>Create a Dashboard:</i> In this exercise, students will explore running analytics data and create an engaging running dashboard, a powerful tool that consolidates essential information and data visualizations in one place. ● Project: Tell Your Story ○ <i>Draft a Design:</i> For this activity, students will take time to explore data storytelling designs and draft their own story. They can create their infographic directly in the spreadsheet or sketch their design on paper, in PowerPoint, or using a program of their choice.
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