



Karel Adventures Course Syllabus

One Year for Elementary School, 25 Hours

Course Overview and Goals

The **Karel Adventures Course** introduces students to the basics of JavaScript as they follow Karel the Dog on fun-filled adventures. Students will develop computational thinking and problem-solving skills while transitioning from block to text-based coding.

Learning Environment: This course can be taught to the whole class or completed asynchronously by students on their own devices. Story-based videos provide instruction and motivation as students practice problem-solving and develop coding skills. Each lesson includes a hands-on programming activity and detailed slide instructions to guide learners.

The course contains **49 lessons** totaling 25 hours of instruction. Each lesson has one coding exercise and therefore varies in length based on story segments and type of exercise. Some lessons build on each other directly. When multiple lessons are part of the same set, they are labeled with the lesson number followed by the letters a, b, and c to show their progression.

KA1.2.3a The Rabbit Chase: Riley's Escape Part 1

Riley's Escape Part 1: Students will move to the shallow water, paint an orange bridge, and chase Riley! Students use code blocks with the option for text-based coding.

Length: 20 minutes

Computer Science JavaScript 5th Grade 6th Grade Sequences Ready-to-Go

KA1.2.3b The Rabbit Chase: Riley's Escape Part 2

Riley's Escape Part 2: Students will paint 2 more bridges to continue the chase! Students use code blocks with the option for text-based coding.

Length: 20 minutes

Computer Science JavaScript 5th Grade 6th Grade Sequences Ready-to-Go

Programming Environment: Students will write and run programs in the embedded **CodeHS editor**. Programs are automatically 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/Karel_Adventures/overview

Course Breakdown

Unit 1: Karel's Coding Environment (1.5 hours)

In this unit, students will learn to navigate Karel's coding environment, understand computer science vocabulary terms, and practice running basic commands.

Objectives / Topics Covered	<ul style="list-style-type: none">• Navigate Karel's coding environment.• Modify existing code.• Write simple code sequences.
Lessons	Karel's Coding Environment: Example Program <ul style="list-style-type: none">• Explore and modify existing code using code blocks or text-based coding. Karel's Coding Environment: Walk Around the Pond <ul style="list-style-type: none">• Write code to help Karel move around a pond. Karel's Coding Environment: Your Favorite Color <ul style="list-style-type: none">• Program Karel to move to a specific color.

Unit 2: The Rabbit Chase (3.5 hours)

In this story-driven unit, students explore how sequences control program flow by solving problems to help Karel clean up.

Objectives / Topics Covered	<ul style="list-style-type: none">• Write sequences of code to solve problems.• Debug programs by identifying and fixing errors.• Use paint commands to code creatively.
Lessons	Time to Clean Up <ul style="list-style-type: none">• Program Karel to place tennis balls into a red bucket. Riley the Troublemaker <ul style="list-style-type: none">• Use paint commands to build a wall around the bucket of tennis balls. Riley's Escape Part 1 <ul style="list-style-type: none">• Program Karel to navigate through a path to chase Riley the rabbit. Riley's Escape Part 2 <ul style="list-style-type: none">• Paint more bridges to continue to chase Riley. Tracking Riley <ul style="list-style-type: none">• Use movement and paint commands to fill in holes along a path. Over the Wall <ul style="list-style-type: none">• Program Karel to build a staircase to get over a wall. Help <ul style="list-style-type: none">• Program Karel to build a ladder to reach Riley. Making Friends <ul style="list-style-type: none">• Complete an extra challenge to paint a picture of Riley the Rabbit.

Unit 3: Lost in Space (4.5 hours)

In this story-driven unit, students will learn about loops and conditionals to solve challenges.

Objectives / Topics Covered	<ul style="list-style-type: none">• Use loops to simplify repeated actions.• Use conditionals to control actions in a program.• Understand how loops improve code efficiency.
Lessons	A Call from Space <ul style="list-style-type: none">• Use paint commands to finish building a spaceship. Directions to Mars <ul style="list-style-type: none">• Use an if statement and conditions to face Mars.

	<p>Asteroid Field Part 1</p> <ul style="list-style-type: none"> • Use if statements and conditions to paint asteroids black. <p>Asteroid Field Part 2</p> <ul style="list-style-type: none"> • Program Karel to destroy asteroids in field 1 and field 2. <p>Landing Systems Engaged</p> <ul style="list-style-type: none"> • Program Karel to engage landing systems for 3 control panels. <p>Perimeter Check</p> <ul style="list-style-type: none"> • Program Karel to use if/else statements and paint commands to check the perimeter. <p>Putting Out Fires Part 1</p> <ul style="list-style-type: none"> • Use while loops to put out fires. <p>Putting Out Fires Part 2</p> <ul style="list-style-type: none"> • Use loops to put out fires by painting them. <p>Tracking Tracy Part 1</p> <ul style="list-style-type: none"> • Add a condition to a while loop and an if/else statement to fill in the missing parts of the code. <p>Tracking Tracy Part 2</p> <ul style="list-style-type: none"> • Use a loop and if statements to move Karel through the trail and cover each hole. <p>Martian Sand Worms</p> <ul style="list-style-type: none"> • Program Karel to cover worm holes to save Tracy.
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Unit 4: Evaluation (4 hours)

Use the projects in this unit to provide students with final engaging challenges to demonstrate the skills they have learned throughout the course.

Objectives / Topics Covered	<ul style="list-style-type: none"> • Use conditionals, loops, and sequences to solve a complex problem or code creatively.
Lessons	<p>Supplies Drop Off</p> <ul style="list-style-type: none"> • Use while loops and if statements to drop off supplies for the sand worms. <p>Create Karel Adventures</p> <ul style="list-style-type: none"> • Create your own Karel Adventures story.

Unit 5: Quest for the Rosetta Stone (5.5 hours)

In this story-driven unit, students explore different types of loops and conditionals as they help Karel save the Rosetta Stone.

Objectives / Topics Covered	<ul style="list-style-type: none"> • Use if/then statements to run code if specific conditions are met. • Use while loops to repeat code as long as a condition is true. • Use for loops to repeat code a set number of times. • Combine multiple control structures to solve problems.
Lessons	<p>Pick Up the Hat 1</p> <ul style="list-style-type: none"> • Use if/else statements to run code if a specific condition is true. <p>Pick Up the Hat 2</p> <ul style="list-style-type: none"> • Use a while loop to pick up Karel's hat. <p>Travel to Egypt</p> <ul style="list-style-type: none"> • Use while loops to help Karel get to Egypt. <p>Approach the Entrance</p> <ul style="list-style-type: none"> • Use while loops and conditionals to move Karel to the temple entrance. <p>Uncover the Hieroglyph</p> <ul style="list-style-type: none"> • Use while loops and conditionals to brush sand away. <p>Light the Torches 1</p> <ul style="list-style-type: none"> • Use a for loop to help Karel light torches. <p>Light the Torches 2</p> <ul style="list-style-type: none"> • Use a for loop to move Karel down each section of the tunnel.

	<p>Leave without a Trace</p> <ul style="list-style-type: none"> • Use a loop and nested if statement to move Karel across the hallway. <p>Which Way?</p> <ul style="list-style-type: none"> • Use a loop and nested if statement to help Karel find a way out of the Maat room. <p>Snakes!</p> <ul style="list-style-type: none"> • Use control structures to avoid snakes on the path. <p>Escape the Scarab Room</p> <ul style="list-style-type: none"> • Use control structures to navigate around barriers. <p>Challenge: Draw a Hieroglyph</p> <ul style="list-style-type: none"> • Create a hidden hieroglyph and write code to uncover it.
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Unit 6: A Day at the Park (4 hours)

In this story-driven unit, students dive deeper into organizing their code using control structures and functions.

Objectives / Topics Covered	<ul style="list-style-type: none"> • Combine loops and conditionals. • Create functions to run programs more efficiently. • Create custom colors to paint with in a program.
Lessons	<p>Karel Clean Up</p> <ul style="list-style-type: none"> • Combine if statements and while loops to check conditions multiple times. <p>Find the Exit</p> <ul style="list-style-type: none"> • Use loops and conditionals to help Karel exit the room. <p>Escape the Bedroom</p> <ul style="list-style-type: none"> • Use a loop and conditional to help Karel get out of the bedroom and collect the balls. <p>Fetch Karel</p> <ul style="list-style-type: none"> • Write functions to help Karel collect tennis balls. <p>Get Down the Hallway</p> <ul style="list-style-type: none"> • Fill in functions to help Karel maneuver through the hallway. <p>Escape the Building</p> <ul style="list-style-type: none"> • Create functions to make it out of the building. <p>Building Towers</p> <ul style="list-style-type: none"> • Use functions to build towers with tennis balls. <p>Get Around the Cars</p> <ul style="list-style-type: none"> • Program Karel to navigate through cars using functions and loops. <p>Find the Park</p> <ul style="list-style-type: none"> • Use functions and control structures to get around buildings to find the park. <p>Making Custom Colors</p> <ul style="list-style-type: none"> • Create custom colors. <p>Make a Tree</p> <ul style="list-style-type: none"> • Paint over an existing tree with colors that look more natural. <p>Set Up the Scavenger Hunt</p> <ul style="list-style-type: none"> • Design a park scene using loops, conditionals, top-down design, and custom colors.

Unit 7: Evaluation (1.5 hours)

Use the project in this unit to provide students with a final challenge to demonstrate the skills they have learned throughout the course.

Objectives / Topics Covered	<ul style="list-style-type: none"> • Use for loops, while loops, and if statements in a program.
Lessons	<p>Collect the Tennis Balls</p> <ul style="list-style-type: none"> • Write a program that has Karel pick up all of the tennis balls.

Karel Adventures Course Supplemental Materials

Resources	Description
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.
These resources and more are found on the CodeHop Resources Page .	