Idaho Middle School Computer Science Course

Middle School (60 Contact Hours)

Course Overview and Goals

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 Idaho Middle School Computer Science 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/27101/overview.

Course Breakdown

Module 1: 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/27101/explore/module/42385

Topics Covered	• History of Computing • Software • Hardware • Cloud Computing • Ethics and Legal Considerations • The Future of Computing • Real-world robotics and their applications
Example Assignments	• History of Computing ○ *Jigsaw: Computer Interaction Over the Decades:* 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 ○ *Case Study: Cloud Computing vs. Physical Computing:* 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 2: Exploring Code with Karel (10 hours)

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/27101/explore/module/38680

Topics Covered	● Syntax ● Syntax Errors ● Comments ● Debugging ● Functions ● For Loops ● Conditional Statements ● if/else Statements ● While Loops ● Control structures ● Decomposition
Example Assignments	● Karel's Evening Walk ○ Take Karel on a walk around the north side of the pond. Remember the directions Karel can face and write a program to move Karel along the path from one edge of the world to the other. Karel should be facing south at the end of the path. But wait! Karel noticed a missing tennis ball laying on the path. Go ahead and let Karel pick it up along the walk. ● Pick Up Tennis Balls ○ Karel needs help picking up the tennis balls lying around the dog park. Create a program that uses two for-loops and ends with Karel in the lower-right corner facing to the right or east. ● Stay Out of the Lake ○ This program is supposed to train Karel to walk up to a lake at any park, but not to jump in. But right now there is a bug! Help fix the bug so that Karel stops moving when reaching the edge of a lake. ● Path to Dog House ○ Karel needs to stay on the pathway to get to the dog house. Make sure Karel continues moving until inside the dog house. Use at least

	3 functions, 1 while loop, 2 conditionals, 1 if/else statement, and 1 nested if statement.

Module 3: Exploring the Internet (10 hours)

Students are introduced to network protocols and different strategies used to protect online information.

Browse the full content of this unit at https://codehs.com/course/27101/explore/module/38681

Objectives / Topics Covered	• What is the Internet? • Need for Protocols • Impact of the Internet • Cybersecurity • CIA Triad • Encryption • Steganography

Example Assignments	• Network Simulation
	  ○ In this simulation, there are six devices in a network. Click the green RUN button to start the simulation. Clicking on a device will prepare it to send a message. Clicking on a second device will send the message to that device.
	• Internet in My Daily Life
	  ○ Envision a normal day, from the time you wake up to the time you go to sleep. In what ways do you use the Internet during your day? For what purposes do you use the Internet? As you go through a normal day in your mind, write down all the ways you use the Internet. Include the device you use and the purpose.
	• Cybersecurity
	  ○ Students will learn what is meant by *cybersecurity* and explore a few news worthy cyber attacks. They will also discuss the *Internet of Things* and the increase in connected devices.
	• 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! Below is the method used to hide the message. Your mission will be to reverse the process and find the secret message!

Module 4: 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/27101/explore/module/38682

Objectives / Topics Covered	• Digital Footprint • Cyberbullying • Internet Safety • Privacy & Security • Information Literacy • Copyright • Hacking Ethics • Cyber Hygiene

Example Assignments	• Digital Footprint and Reputation
	  ○ *Building a Positive Digital Footprint:* 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
	  ○ *Scenario: School Stranger:* 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
	  ○ *Evaluate the Source 1:* 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?

Module 5: Exploring Art with Code (10 hours)

Students explore the intersection of art and technology by creating art programs using p5.js.

Browse the full content of this unit at https://codehs.com/course/27101/explore/module/38683

Objectives / Topics Covered	• p5.js • Variables • Loops • Color Transitions • Shape Transformations • Direction

	• Keyboard Data

Example Assignments	• Creative Coding
	  ○ Learn what creative coding is and how you can use it to create cool art!
	• MouseX and MouseY
	  ○ Let's practice using the mouseX and mouseY together by recreating the following sketch.
	• Grayscale to Color
	  ○ Let's recreate an animation where the color of the shapes transitions from grayscale to color.
	• Project: Animate an Emoji
	  ○ Create a p5.js animation with your own emoji.

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/27101/explore/module/38684

Topics Covered	• Data as a Resource • Using Databases • Introduction to Spreadsheets • Sort and Filter • Statistical Measures • Models • Visualizing Data

Example Assignments	• Sort and Filter
	  ○ *Influential Women:* 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
	  ○ *Mammal Statistics:* 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
	  ○ *Create a Dashboard:* 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
	  ○ *Draft a Design:* 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.