Oklahoma Exploring Computer Science - Gr 8 Syllabus

Middle School (100 Contact Hours)

Course Overview and Goals

In this Oklahoma Exploring Computer Science - Gr 8 course, students will be introduced to the exciting world of computers and technology! They will gain foundational skills in programming, explore the vast potential of the internet, and understand how to be a responsible digital citizen. Through engaging activities and projects, students will learn how technology can be used to solve problems, analyze data, and navigate the digital world effectively.

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, simulations, and free-response prompts. Each module ends with a comprehensive quiz that assesses students' mastery of that module's material.

More Information

Browse the content of this course at https://codehs.com/course/24049/overview

Prerequisites

The Oklahoma Exploring Computer Science - Gr 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 those new to computer science.

Course Breakdown

Module 1: Programming with Turtle Graphics (6 weeks/30 hours)

In this module, students learn Python commands, functions, and control structures by drawing shapes on the screen and solving puzzles with Turtle Graphics.

Browse the full content of this unit at https://codehs.com/course/24049/explore/module/32932

Topics Covered	• What is a Command? • Moving Tracy • Tracy's Coordinate System • For Loops • Functions and Parameters • Top Down Design • Variables • User Input • If/else Statements

	• While Loops

Example Assignments	• Row of Circles
	  ○ In this program, Tracy should draw a row of circles across the width of the canvas using a for loop.
	• Circle Pyramid
	  ○ Write a program that directs Tracy to draw a pyramid with 3 circles on the bottom row, 2 in the middle, and 1 on top.
	• Bubble Wrap 2.0
	  ○ In this program, you should have Tracy add highlights to each bubble from our Bubble Wrap example program. Use top down design to break this large problem into smaller pieces!
	• Rating
	  ○ Write a program that shows a graphical representation of a user's rating value. If the value is between 1 and 4, draw a red X. If it is between 5 and 7, draw a yellow horizontal line. If it is an 8 or above, draw a green checkmark.

Module 2: Exploring Computing (3 weeks/15 hours)

In this module, students explore different technologies and the impact they have on our world.

Browse the full content of this module at https://codehs.com/course/24049/explore/module/42355

Topics Covered	• History of Computing • Software and Hardware • Troubleshooting • Computers Speak Binary • Cloud Computing • Internet of Things

Example Assignments	• Brainstorm: New Computer Components
	  ○ In this activity, you are going to work with a partner to brainstorm 3 new components for a computer. It can be an entirely new idea or an improvement of an existing component. As you think about your ideas, think about how you interact with a computer and also the physical hardware of computers.
	• Support Ticket
	  ○ As part of your training as a new IT support team member, you have been assigned a support ticket. Make a copy of the support ticket shown in the item and work on it throughout the lesson. You will submit the completed support ticket at the end of this lesson.
	• Write a Message in Binary
	  ○ In this activity, you will use ASCII encoding to write the same message in binary. Then, you will trade messages with a partner and use ASCII encoding to figure out your partner's message

Module 3: Project: Using Technology to Solve Problems (1 week/5 hours)

In this project, students will work collaboratively to plan, develop, and present an innovation that solves a real world problem.

Browse the full content of this module at https://codehs.com/course/24049/explore/module/32934

Topics Covered	• Hardware • Software • Computing Innovations • Using Surveys

Example Assignments	• Step 1: Problem Analysis
	• Step 2: Hardware Selection
	  ○ What specific hardware will your device need? Some examples of hardware include sensors, cameras, lights, motors, robots, and wearable items, like a headset or watch.
	• Step 3: Software Components
	  ○ What specific software will your system need? Some example software includes data analytics, user interfaces or apps, and hardware control.
	• Step 4: Prototype
	  ○ Draw a sketch of your prototype or create a physical prototype. Your prototype should clearly illustrate both the hardware and the software components.
	• Step 5: Pitch
	  ○ A pitch refers to a presentation that attempts to persuade others about the value of an idea or innovation. The goal of a pitch is to capture the attention of the audience, generate interest, and secure support. For your pitch, you will create a slideshow using Google Slides, PowerPoint, or another presentation software.

Module 4: Exploring the Internet (2 weeks/10 hours)

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

Browse the full content of this module at https://codehs.com/course/24049/explore/module/32935

Topics Covered	• Protocols • Routing and Packets • Cybersecurity • Encryption

Example Assignments	• Four Hats Reflection
	  ○ Thinking about a topic of interest from different perspectives is a great practice to ensure you consider all different viewpoints! In this exercise, you will create a webpage that displays ideas about the impact of the internet from different perspectives. You will wear four different "hats" to direct your perspective.
	• Cyber Defense 3-2-1
	  ○ Name three (3) examples of personal information that exist on the Internet that need to be protected. What are two (2) things to look out for to avoid accidentally downloading a virus? What is one (1) way

	that you can help defend yourself against viruses and malware? ● Security Tradeoffs ○ Security is very important, but there do come tradeoffs when implementing these procedures. For example, if you have multi-factor authentication on your email account, you may not be able to sign in unless you know your password and can also input a code that is sent to your phone. The tradeoff here is that your account is very secure, but it takes you a longer time to sign in! Using what you learned in this module, describe at least three trade-offs for implementing security safeguards. How is the CIA triad affected by each one? Does strengthening one part of the CIA Triad weaken another?

Module 5: Exploring Digital Citizenship (2 weeks/10 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/24049/explore/module/32936

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 6: Exploring Data and Spreadsheets (2-3 weeks/20-30 hours)

In this module, students learn about data and spreadsheets and create a data story using data analysis and visualizations.

Browse the full content of this module at https://codehs.com/course/24049/explore/module/32939

Topics Covered	● Getting Started with Data ● Spreadsheets ● Data Storytelling ● Data Visualizations
Example Assignments	● Project: Data Storytelling ○ In this project, you will get to tell your own data story. You will create a visually appealing infographic that displays important data visualizations. The infographic will also tell a story based on your

	interpretation after exploring and analyzing data. You can choose any topic to start creating your data story. Choose a topic that is of interest or importance to you and will make for a good story! ● Peer Review ○ A peer review is an important part of the research process because it provides a way of checking the validity, credibility, and quality of the research.