

Ridgefield Public Schools

AP Computer Science Principles Curriculum at a Glance

Overview

AP Computer Science Principles is designed to be equivalent to a first-semester introductory college computing course for students who may be interested in pursuing computer science in the future. In this course, students will develop computational thinking skills vital for success across all disciplines, such as using computational tools to work with large data sets to analyze, visualize, and draw conclusions from trends. This course encourages students to apply creative processes when developing computational artifacts and to think creatively while using computer software and other technology to explore questions that interest them. Students will also develop effective communication and collaboration skills, work both individually and collaboratively to solve problems, and discuss and write about the importance of these problems and the impacts to their community, society and the world. If enrollment is limited, the course may only be offered in alternating years. All students are expected to take the AP exam in May.

Big Ideas	
Big Idea 1:	Creative Development • Collaboration • Program Function and Purpose • Program Design and Development • Identifying and Correcting Errors
Big Idea 2:	Data • Binary Numbers • Data Compression • Extracting Information from Data • Using Programs with Data
Big Idea 3:	Algorithms • Variables and Assignments • Data Abstraction • Mathematical Expressions



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	• Strings • Boolean Expressions • Conditionals • Nested Conditionals • Iteration • Developing Algorithms • Lists • Binary Search • Calling Procedures • Libraries • Random Variables • Simulations • Algorithmic Efficiency • Undecidable Problems
Big Idea 4:	Computer Systems and Networks • The Internet • Fault Tolerance • Parallel and Distributed Computing
Big Idea 5:	Impact of Computing • Beneficial and Harmful Effects • Digital Divide • Computing Bias • Crowdsourcing • Legal and Ethical Concerns • Safe Computing

Units of Study	
Unit 1:	Digital Information - Students explore how computers store complex information like numbers, text, images, and sound, and they debate the impacts of digitizing information
Unit 2:	The Internet - Students learn how the Internet works and discuss its impacts on politics, culture, and the economy



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Unit 3:	Intro to Programming with Python - Students design their first program in Python while learning both fundamental programming concepts and collaborative software development processes
Unit 4:	Functions and Conditionals - Students expand the kinds of programs they can create by adding the ability to use input, make decisions (conditionals), and better organize their code (functions)
Unit 5:	Data - Students explore and visualize datasets from a wide variety of topics as they hunt for patterns and try to learn more about the world around them
Unit 6:	Groups, Lists, and Loops - Students learn to build programs that use and process lists of information
Unit 7:	Complex Conditionals, Events, and Libraries - Students learn how to design clean and reusable code that can be shared with a single classmate or the entire world
Unit 8:	Cybersecurity and Global Impacts - Students research and debate current events at the intersection of data, public policy, law, ethics, and societal impact
Unit 9:	Create Performance Task - Students practice and complete the Create Performance Task
Unit 10:	Algorithms - Students learn to design and analyze algorithms to understand how they work and why some algorithms are considered more efficient than others

