# Computer Science A
## Curriculum Overview

**Why Computer Science? Every 21st century student should have the opportunity to learn computer science. The basics of computer science help nurture creativity and problem-solving skills, preparing students for a future in any field or career.**

## Advanced Placement Computer Science for All Students!

Code.org's Computer Science A is an Advanced Placement (AP®) course designed to broaden participation in computer science. Code.org is recognized by the College Board as an endorsed provider of AP® Computer Science A curriculum and professional development. The Course has been reviewed by the College Board and is pre-approved to pass the audit. The professional development is also endorsed by the College Board as meeting (and exceeding) the standards of the AP® Summer Institutes.

## Engaging Curriculum

Our team designed the AP Computer Science A curriculum to support students and teachers familiar to the discipline, having already covered Computer Science Discoveries (CSD) or Computer Science Principles (CSP). The curriculum introduces students to programming using Java and empowers them to practice skills used in the field.

## One-Year Professional Learning Program

- **Summer:** Teachers attend a five-day in-person workshop designed to introduce CS concepts from the curriculum, AP® elements of the course, and core teaching practices. (Travel may be required.)

- **School Year:** Teachers engage in continued learning through professional development workshops focused on supporting their first year of implementation.

- **The Following Summer:** Teachers attend a two-day workshop to deepen content knowledge and prepare for the following year of teaching CSA.

**Teachers have been advocating for the development of an equitable and culturally responsive CSA curriculum: 84% of CS Principles teachers told us last year they want to start teaching CSA using Code.org!**

"The Code.org approach has empowered millions to have access to CS education. Adding CSA would be welcomed by all of us working to build capacity and grow access to CS for all learners. If you build it, it will be well-done and connected to the real world."

"I have a feeling that if Code.org developed a CSA curriculum, my district would jump on board to use it. We already use Code.org for CSP, and being able to utilize the same program for both courses would be extremely beneficial."

## Curriculum Features:

- Students learn Java by developing visual and multimedia programs using "The Neighborhood," "The Theater," and "The Playground," in addition to console and file input and output
- Daily instructional lesson plans that include inquiry/equity-based pedagogy and background content
- Formative and summative assessments, project exemplars, and rubrics
- Concept and tutorial videos for students
- Code.org -- a learning platform where students interact with lesson materials and tools, and where teachers access a dashboard to see student work and progress
- Java Lab -- a Java programming environment in Code Studio, designed for creating object-oriented programs with a text-based editor and debugging capabilities

## CSA Unit Overview

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| **Unit 1 - Object Oriented Programming** | In this unit, students learn fundamental Java concepts and discover their identity as software engineers and use debugging strategies and code reviews to improve their programming skills. |
| **Unit 2 - Giving Objects State** | In this unit, students develop an understanding of data encapsulation and object-oriented design decisions. |
| **Unit 3 - Expanding Program Data** | In this unit, students create one-dimensional arrays to store lists of primitive values and object references. |
| **Unit 4 - Expanding Program Logic** | In this unit, students further expand the capabilities of their programs through the use of APIs and libraries to implement files and simple GUI elements. |
| **Unit 5 - Giving Objects Organization** | In this unit, students use two-dimensional (2D) arrays to expand storage and organization capabilities in their programs. |
| **Unit 6 - Expanding Program Capability** | In this unit, students use ArrayLists to store program data and differentiate between when to use 1D and 2D arrays and ArrayLists. |
| **Unit 7 - Expanding Program Behavior** | In this unit, students practice software design and development using the skills and programming constructs they have learned. |
| **Unit 8 - Giving Objects Life** | In this unit, students implement searching and sorting algorithms to improve the efficiency and capabilities of their programs. |
| **Unit 9 - AP Review and Beyond** | Students prep for the AP exam by practicing strategies for the Multiple-Choice Questions and writing solutions for the Free-Response Questions. |

**Learn more about professional learning: https://code.org/professional-learning**
**For curriculum, videos, support documents, and more, visit: https://code.org/csa**

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