Unit 06: Arrays

Content Area: **Computer Science**
Course(s):
Time Period: **Marking Period 2**
Length: **2-3 Weeks**
Status: **Published**

Summary

This unit focuses on data structures, which are used to represent collections of related data using a single variable rather than multiple variables. Using a data structure along with iterative statements with appropriate bounds will allow for similar treatment to be applied more easily to all values in the collection. Just as there are useful standard algorithms when dealing with primitive data, there are standard algorithms to use with data structures. In this unit, we apply standard algorithms to arrays; however, these same algorithms are used with ArrayLists and 2D arrays as well. Additional standard algorithms, such as standard searching and sorting algorithms, will be covered in the next unit.

Revision Date: July 2026

L.SS.11–12.1	Demonstrate command of the system and structure of the English language when writing or speaking.
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
P.4	Demonstrate creativity and innovation.
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
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L.KL.11–12.2	Apply knowledge of language to understand how language functions in different contexts, to make effective choices for meaning or style, and to comprehend more fully when reading or listening.
9.4.12.CT	Critical Thinking and Problem-solving
P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
P.9	Work productively in teams while using cultural/global competence.
8.1.12.DA.2	Describe the trade-offs in how and where data is organized and stored.
8.1.12.AP.1	Design algorithms to solve computational problems using a combination of original and existing algorithms.
9.4.12.IML.3	Analyze data using tools and models to make valid and reliable claims, or to determine optimal design solutions (e.g., S-ID.B.6a., 8.1.12.DA.5, 7.1.IH.IPRET.8).
8.1.12.AP.2	Create generalized computational solutions using collections instead of repeatedly using simple variables.
8.1.12.AP.5	Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects.

Essential Questions & Essential Understanding

- How are collections of data created?
- How do you avoid off-by-one errors?

- How do you traverse an array?
- What are the limitations of arrays?
- What common algorithms exist using arrays?

Objectives

Students Will Know

- how to create an array of primitive data and objects.
- that arrays are immutable and can only adjust size by creating a new array, copying information over and replacing the old array in memory.
- how to select individual items in an array or subsets of an array to analyze data.
- how to traverse an array using for, while and enhanced for loops.
- that arrays are pass by reference, so when an array is an argument to a method, that method can adjust the values in the array (unlike primitive arguments).

Students Will Be Skilled At

- recognizing solutions to runtime, logic and syntax errors when dealing with arrays.
- developing algorithms to analyze data stored in an array.

Learning Plan

Lecture and demonstration on creating arrays, retrieving information and capabilities of arrays and their methods.

Pair programming exercises on common algorithms, common errors and building algorithms.

Lecture on for loops, while loops (do while loops) and enhanced for loops.

Lab assignments on array creation and analyzing.

Assessments

Assessments

- Formative: Daily assessments using examples from class notes and CodeHS.com, AP Classroom/Albert Checks for Understanding
- Summative: Teacher-created assessments/projects and CodeHS Computer Science Projects, AP

Classroom/Albert Unit Assessments

- Benchmark: Check for understanding benchmark assessments on CodeHS, AP Classroom/Albert/Khan Academy Diagnostics

- Alternative Assessments: Student-centered activities such as a doorbell coding project, game design projects, and other activities involving real world applications

complete performance tasks:

- Students will be able to design programs using arrays within their code.
- Students will be able to write programs traversing arrays in order to solve given problems.

complete quizzes/tests:

- creating arrays & filling in information
- array methods and passing arrays to methods
- building algorithms to solve problems
- errors within array code

complete sample AP multiple choice questions.

complete sample AP open ended questions.

Midterm Exam

Materials

Core instructional materials: Computing Concepts with Java

Supplemental instructional materials:

Java Concepts for AP Computer Science Study Guide
CollegeBoard AP Classroom Website
CollegeBoard AP Computer Science A Website

Integrated Accomodations & Modifications

Possible accommodations/modification for AP Computer Science A