AP Computer Science Principles A	Scope and Sequence
Unit Lesson	**Objectives**
THE DIGITAL WORLD	
How Have Computers Changed Your Life?	
	Describe the purpose of computer innovations.
What Language Do Computers Talk?	
	Calculate the binary equivalent of decimal numbers, and vice versa.
Strings You Cannot Tie	
	Convert between characters and ASCII values.
When Numbers Do Not Behave	
	Describe limitations due to overflow and rounding.
Project: Compare Generations	
	Investigate how computer innovations have changed the life of an adult over 50 years old.
Data: Music to Your Ears	
	Describe how music can be represented as bits.
Breaking Images into Bits	
	Describe how images are represented as bits.
Data Compression	
	Describe how to maximize bandwidth.
Programming without Words	
	Use a visual programming language to accomplish a task.
Project: Analyze an Image	
	Create a bit representation of a black and white image.
Review: The Digital World	

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Test	
THE INTERNET	
Network Building Blocks	
	Identify computing devices
Building a Network	
	Identify the components of a network and how they function.
Network Protocols	
	Describe how data travel through a network.
Where's My Web?	
	Describe how the World Wide Web functions.
Project: Is the Internet Worth Keeping?	
	Evaluate whether the internet has been an overall benefit to society using at least three criteria.
Fault Tolerance	
	Describe factors related to fault tolerance.
How the Web Grows	
	Describe how the World Wide Web has been able to grow to accommodate an increasing number of users.
Parallel and Distributed Computing	
	Compare problem solutions using sequential, parallel, and distributed computing.
What Has Distributed Computing Done for You?	
	Describe innovations discovered through the use of parallel and distributed computing.
Project: Compare Problem Solutions	
	Compare the efficiency of performing a task sequentially, in parallel, and using the distributed

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		model.
	Review: The Internet	
	Test	
PROGRAMMING		
	Computer Arithmetic	
		Represent and evaluate arithmetic expressions.
		Identify meaningful variable names.
	Planning Your Program	
		Describe flowcharts and pseudocode.
	Writing a Program	
		Interpret short programs.
	What Happens When You Run a Program?	
		Describe how programs are executed.
	Building Your Application	
		Interpret programs that manipulate numbers and strings.
	Lists: The Everything Container	
		Interpret lists.
	Manipulating Lists	
		Interpret list manipulations.
	Design as a Collaborative Process	
		Describe techniques used by teams of programmers.
		Describe pair programming.

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Project: Write a Program with Your Partner	
	Plan and write a program with your partner to perform at least 10 calculations.
Data Abstractions	
	Describe how data abstractions help manage data.
Getting Input	
	Describe how to acquire input from the user.
Event-Driven Programs	
	Describe event-driven programs.
Design as an Iterative Process	
	Describe common software development processes.
Project: Plan a Program and Its User Interface as a Team	
	Develop a plan for a program with an interface as part of the plan.
Review: Programming	
	Represent and evaluate arithmetic expressions.
	Identify meaningful variable names.
	Describe flowcharts and pseudocode.
	Interpret short programs.
	Describe how programs are executed.
	Interpret programs that manipulate numbers and strings.
	Interpret lists.
Test	
CONTROLLING YOUR PROGRAM FLOW	

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	When Errors Happen	
		Identify the types of errors and ways to correct them.
	Testing Programs	
		Describe ways to test programs.
	Manipulating Strings	
		Evaluate expressions that use string manipulation.
	Relational Operators	
		Interpret expressions using relational operators.
	Logical Operators	
		Interpret expressions using logical operators.
	Project: Plan a Program Using Choices	
		Plan a project that uses at least two choices.
		Plan how you will test for errors.
	Conditionals	
		Interpret conditional statements.
	Nested Conditionals	
		Interpret nested conditional statements.
	Iteration	
		Interpret for loops.
	Nested Loops	
		Interpret nested loops.
	While Loops	

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	Interpret while loops.
Project: Write a Program Using Choices	
	Write a program that uses at least two choices.
	Test for errors and correct any errors found.
Review: Controlling Your Program Flow	
Test	
DOING MORE WITH ALGORITHMS	
Comparing Algorithms	
	Determine if two algorithms yield the same result.
Modifying Existing Algorithms	
	Identify modifications that modify an existing algorithm to accomplish a new task.
List Operations	
	Interpret expressions utilizing list indexing.
Linear Searching	
	Interpret list traversals.
Binary Search	
	Describe a binary search.
Project: Manipulate Lists in a Program	
	Write a program that manipulates lists in at least three ways, including a search.
Calling Procedures	
	Determine the result of a procedure call.
Interpreting the Exam Procedure Call	

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	Determine the result of a procedure call using the AP exam format.
How Functions/Procedures Manage Complexity	
	Identify functions/procedures that can be used to manage complexity.
What's My Procedure?	
	Identify procedures that solve specific problems.
Sending Output	
	Describe the types of program output
Project: Program with Functions	
	Write a program with two functions that process lists.
Review: Doing More with Algorithms	
Test	
SEMESTER REVIEW AND EXAM	
Semester Review	
Semester Exam	