CompuScholar, Inc.

Alignment to Arkansas **High School Programming** Standards

Arkansas Course Details:

Course Title:	High School Programming
Course Code(s):	465070 / 465080 / 465090
Grade Level:	9th - 12th Grade
Standards Link:	Computer Science Standards and Courses (2021)

CompuScholar Course Details:

Course Title:	Java Programming
Course ISBN:	978-1-946113-99-3
Course Year:	2021

Note 1: Citation(s) listed may represent a subset of the instances where objectives are met throughout the course.

Note 2: Citation(s) for a "Lesson" refer to the "Lesson Text" elements and associated "Activities" within the course, unless otherwise noted. The "Instructional Video" components are supplements designed to introduce or re-enforce the main lesson concepts, and the Lesson Text contains full details.

Arkansas Course Description

The Arkansas Computer Science and Computing Initiative standards for high school courses are designed to provide understandings of concepts in computer science that are necessary for students to function in an ever-changing technological world. Through these standards, students will explore, apply, and move toward mastery in skills and concepts related to Computational Thinking and Problem Solving; Data, Information, and Security; Algorithms and Programs; Computers and Communications; and Professionalism and Impacts of Computing. These standards help students learn to accomplish tasks and solve problems independently and collaboratively. These standards give students the tools and skills needed to be successful in college and careers including computer science, computing, and other fields.

Usage Guidance

CompuScholar's **Java Programming** course can be used to meet the Arkansas Programming standards as listed below. Schools can flexibly apply the course material to a Year 1, Year 2 or Year 3 classroom.

Course Standards

Strand: Computational Thinking and Problem Solving Content Cluster 1: Students will analyze and utilize problem-solving strategies		CITATION(S)
CSPG.Y1.1.1	Leverage problem-solving strategies to solve problems of level-appropriate complexity	Chapters 10, 11, 13
CSPG.Y2.1.1	Leverage problem-solving strategies to solve problems of level-appropriate complexity	
CSPG.Y3.1.1	Leverage problem-solving strategies to solve problems of level-appropriate complexity	
CSPG.Y1.1.2	Analyze and utilize multiple representations of problem-solving logic used to solve problems of appropriate complexity	Chapters 8 - 13, 18 - 21
CSPG.Y2.1.2	Analyze and utilize multiple representations of problem-solving logic used to solve problems of appropriate complexity	
CSPG.Y3.1.2	Analyze and utilize multiple representations of problem-solving logic used to solve problems of appropriate complexity	
CSPG.Y1.1.3	Analyze and utilize collaborative methods in problem solving of level-appropriate complexity	Chapter 27
CSPG.Y2.1.3	Analyze and utilize collaborative methods in problem solving of level-appropriate complexity	
CSPG.Y3.1.3	Analyze and utilize collaborative methods in problem solving of level-appropriate complexity	
CSPG.Y1.1.4	Analyze and utilize level-appropriate troubleshooting strategies for hardware and software	Chapter 11
CSPG.Y2.1.4	Analyze and utilize level-appropriate troubleshooting strategies for hardware and software	
CSPG.Y3.1.4	Analyze and utilize level-appropriate troubleshooting strategies for hardware and software	
N/A	*This standard does not start until a later year*	Chapters 13, 14, 15, 26
CSPG.Y2.1.5	Decompose problems of level-appropriate complexity	
CSPG.Y3.1.5	Decompose problems of level-appropriate complexity	

Strand: Computational Thinking and Problem Solving **Content Cluster 2: Students will analyze and utilize connections between concepts of mathematics and computer science.**		**CITATION(S)**
CSPG.Y1.2.1	Interpret relational and logical expressions of level-appropriate complexity using comparison and Boolean operators	Chapters 8, 9
CSPG.Y2.2.1	Interpret compound expressions using multiple relational and logical operators	
N/A	*Continuation not specified at this level*	
CSPG.Y1.2.2	Classify the types of information that can be stored as variables and analyze the appropriateness of each (e.g., Booleans, characters, integers, floating points, strings)	Chapters 3, 4, 6
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.2.3	Analyze how computer science concepts relate to the field of mathematics	Chapters 4, 7
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.2.4	Discuss and apply concepts of abstraction	Chapters 14, 22, 23
CSPG.Y2.2.4	Analyze and utilize concepts of abstraction as modeling and abstraction as encapsulation	
N/A	*Continuation not specified at this level*	
CSPG.Y1.2.5	Perform operations of level-appropriate complexity with binary, decimal, and hexadecimal numbers	Chapters 4, 7
CSPG.Y2.2.5	Perform operations of level-appropriate complexity with binary, octal, decimal, and hexadecimal numbers	
N/A	*Continuation not specified at this level*	
CSPG.Y1.2.6	Demonstrate operator precedence in expressions and statements	Chapter 4, Lesson 1 Chapter 9, Lesson 2
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

Strand: Data, Information, and Security **Content Cluster 3: Students will analyze and utilize data through the use of computing devices.**		**CITATION(S)**
CSPG.Y1.3.1	Define, store, access, and manipulate level-appropriate data (e.g., primitive, linear)	Chapters 3, 4, 6, 14, 18, 19, 21 Supplemental Chapter 1, Lesson 5
CSPG.Y2.3.1	Create programs to store, access, and manipulate level-appropriate data (e.g., structured data, objects	
CSPG.Y3.3.1	Create programs that store, access, and manipulate, with high level of efficiency, level-appropriate data	
CSPG.Y1.3.2	Define and discuss different examples of level-appropriate quantitative and qualitative data	Chapters 3, 4, 6, 14, 18, 19, 21
CSPG.Y2.3.2	Define and discuss different examples of level-appropriate quantitative and qualitative data	
N/A	*Continuation not specified at this level*	
N/A	*This standard does not start until a later year*	Chapters 13, 17, 27 Supplemental Chapter 1, Lesson 4
CSPG.Y2.3.3	Research, discuss, and create level-appropriate programs to model and simulate probabilistic and real-world scenarios	
CSPG.Y3.3.3	Create and test models and simulations to answer student-identified questions and scenarios	
CSPG.Y1.3.4	Analyze, utilize, and visually represent level-appropriate data	Chapters 3, 4, 6, 14, 18, 19, 21 Supplemental Chapter 1, Lesson 5
CSPG.Y2.3.4	Analyze, utilize, and visually represent level-appropriate static and dynamic data	
N/A	*Continuation not specified at this level*	
CSPG.Y1.3.5	Perform level-appropriate data analysis using computing tools	Chapters 13, 18 - 21 Supplemental Chapter 1, Lesson 4
CSPG.Y2.3.5	Perform level-appropriate data analysis using computing tools	
CSPG.Y3.3.5	Discuss real-world data sources that can be mined to produce new knowledge	
N/A	*This standard does not start until a later year*	Chapters 20, 33 Supplemental Chapter 1, Lesson 4
CSPG.Y2.3.6	Examine the capacity of computing technology to create and process large sets of data	
CSPG.Y3.3.6	Issue queries against data sets to produce new knowledge from stored data (e.g., databases, large sets of data)	

Strand: Data, Information, and Security **Content Cluster 4: Students will analyze and utilize concepts of cybersecurity.**		**CITATION(S)**
CSPG.Y1.4.1	Identify the five pillars of cybersecurity and evaluate the relevance of each pillar to computer science concepts	Chapter 1, Lesson 5
CSPG.Y2.4.1	Apply the five pillars of cybersecurity as applicable to level-appropriate computer science concepts	
N/A	*Continuation not specified at this level*	
CSPG.Y1.4.2	Research and describe different roles within the hacking community (e.g., white hat, black hat, gray hat hacking), including positive and negative motivations, significant impacts, and social stereotypes	Chapter 1, Lesson 5
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.4.3	Research and describe the impacts of ransomware, trojans, viruses, and other malware	Chapter 1, Lesson 5
CSPG.Y2.4.3	Research and describe common attacks on hardware, software, and networks	
CSPG.Y3.4.3	Utilize a defined process or tool to identify and resolve security vulnerabilities in student-created programs	
CSPG.Y1.4.4	Explain implications related to identification and responsible reporting of a vulnerability versus exploitation	Chapter 1, Lesson 5
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

Strand: Algorithms and Programs **Content Cluster 5: Students will create, evaluate, and modify algorithms**		**CITATION(S)**
CSPG.Y1.5.1	Design and implement level-appropriate algorithms that use iteration, selection, and sequence	Chapters 13, 18 - 21, 24
CSPG.Y2.5.1	Design and implement level-appropriate algorithms that use iteration, recursion, selection, and sequence	
CSPG.Y3.5.1	Design and implement level-appropriate algorithms that solve student-identified problems	

CSPG.Y1.5.2	Illustrate the flow of execution of algorithms in level-appropriate programs including branching and	Chapters 13, 18 - 21, 24
CSPG.Y2.5.2	Illustrate the flow of execution of algorithms in level-appropriate programs including recursion	
N/A	*Continuation not specified at this level*	
CSPG.Y1.5.3	Evaluate the qualities of level-appropriate student-created and non-student-created algorithms	Chapters 13, 18 - 21, 24, 33
CSPG.Y2.5.3	Evaluate the qualities of level-appropriate student-created and non-student-created algorithms including classic search and sort algorithms	
CSPG.Y3.5.3	Evaluate the qualities of level-appropriate student-created and non-student-created algorithms in terms of time and space complexities (e.g., Big O notation)	
CSPG.Y1.5.4	Use a systematic approach to detect and resolve errors in a given algorithm	Chapters 10, 11
CSPG.Y2.5.4	Use a systematic approach to detect and resolve errors in a given algorithm	
CSPG.Y3.5.4	Use a systematic approach to detect and resolve errors in a given algorithm	

Strand: Algorithms and Programs **Content Cluster 6: Students will create programs to solve problems.**		**CITATION(S)**
CSPG.Y1.6.1	Create programs using procedures to solve problems of level-appropriate complexity	Chapters 15, 16, 22, 23
CSPG.Y2.6.1	Create programs to solve problems of level-appropriate complexity	
CSPG.Y3.6.1	Create programs to solve problems of level-appropriate complexity utilizing inheritance and polymorphism	
CSPG.Y1.6.2	Discuss and apply best practices of program design and format (e.g., descriptive names, documentation, indentation, user experience design, whitespace)	Chapter 2, Lesson 3 Chapter 3 Chapter 27
CSPG.Y2.6.2	Discuss and apply best practices of program design and format (e.g., descriptive names, documentation, indentation, user experience design, whitespace)	
CSPG.Y3.6.2	Discuss and apply best practices of program design, user experience design, and format (e.g., descriptive names, documentation, indentation, whitespace)	

CSPG.Y1.6.3	Determine the scope and state of variables declared in procedures and control structures over time	Chapters 15, 16, 22, 23
CSPG.Y2.6.3	Determine the scope and state of variables defined in classes and their procedures	
CSPG.Y3.6.3	Determine the scope and state of variables defined in classes and class methods involving inheritance and polymorphism	
CSPG.Y1.6.4	Create programs of level-appropriate complexity that read from standard input, write to standard output, read from a file, write to a file, and append to a file	Chapter 2, Lesson 3 Chapter 5, Lesson 5 Chapter 25
CSPG.Y2.6.4	Create programs that read from, write to, and append to a file of level-appropriate complexity that includes structured data	
CSPG.Y3.6.4	Create programs that read from, write to, and manipulate binary files (e.g., images, sounds)	
CSPG.Y1.6.5	Use a systematic approach to detect logic, runtime, and syntax errors within a program	Chapter 11
CSPG.Y2.6.5	Use a systematic approach to detect logic, runtime, and syntax errors within a program	
CSPG.Y3.6.5	Use a systematic approach to detect logic, runtime, and syntax errors within a program	

Strand: Computers and Communications		**CITATION(S)**
Content Cluster 7: Students will analyze the utilization of computers within industry.		
CSPG.Y1.7.1	Identify hardware and software specific to carrying out the mission of regional industries	Chapter 1, Lessons 1, 2
CSPG.Y2.7.1	Utilize hardware and/or software to solve level-appropriate industry-based problems	
CSPG.Y3.7.1	Integrate multiple hardware and/or software tools to solve level-appropriate industry-based problems	
CSPG.Y1.7.2	Research advancing and emerging technologies (e.g., artificially intelligent agents, blockchain, extended reality, Internet of Things (IoT), machine learning, robotics)	Supplemental Chapter 1 Supplemental Chapter 3, Lesson 3
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

Strand: Computers and Communications **Content Cluster 8: Students will analyze communication methods and systems used to transmit information among computing devices.**		**CITATION(S)**
CSPG.Y1.8.1	Utilize the command line to accomplish common network troubleshooting tasks at an introductory level	Supplemental Chapter 4 (see also our Digital Savvy course)
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.8.2	Research and describe common networking concepts at an introductory level	Supplemental Chapter 4
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.8.3	Research and describe modems, network interface cards, routers (e.g., consumer, industrial), switches, and wireless access points, and identify their purposes within a network	Supplemental Chapter 4 Lessons 1 - 4
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.8.4	Describe the importance of creating and using common rules for communication and the utilization of common network protocols including the relationship between client and server	Supplemental Chapter 4, Lesson 5
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

Strand: Computers and Communications **Content Cluster 9: Students will utilize appropriate hardware and software.**		**CITATION(S)**
CSPG.Y1.9.1	Compare and contrast computer programming paradigms (e.g., functional, imperative, object-oriented)	Chapters 5, 14
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

CSPG.Y1.9.2	Research, describe, and utilize at an appropriate level: * Debugging strategies * Integrated development environments (IDE) * Source-code editors	Chapters 2, 11, 29 Chapter 27 Supplemental Chapter 1, Lesson 4
CSPG.Y2.9.2	Use collaboration tools and version control systems in a group software project of appropriate complexity	
CSPG.Y3.9.2	Compare, contrast, and utilize collaboration tools and/or version control systems in a group software project of appropriate complexity	
CSPG.Y1.9.3	Classify layers of software (e.g., applications, drivers, firmware, operating systems) utilized within various platforms (e.g., Android, ChromeOS, iOS, Linux, macOS, Windows)	Chapter 1, Lesson 3
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.9.4	Identify and describe the purpose of hardware components within various personal computing platforms	Chapter 1, Lesson 2
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

Strand: Professionalism and Impacts of Computing		**CITATION(S)**
Content Cluster 10: Students will analyze the impacts of technology and professionalism within the computing community.		
CSPG.Y1.10.1	Research and describe the risks and risk mitigation strategies associated with the utilization and implementation of social media and other digital technology implications	Supplemental Chapter 3, Lessons 1 - 3
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

N/A	*This standard does not start until a later year*	Chapter 1, Lesson 5
CSPG.Y2.10.2	Research and describe issues related to creating and enforcing cyber-related laws and regulations (e.g., ethical challenges, policy vacuum, privacy versus security, unintended consequences)	
N/A	*Continuation not specified at this level*	
CSPG.Y1.10.3	Research and describe the potential benefits associated with the utilization and implementation of social media and other digital technologies	Supplemental Chapter 3
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.10.4	Research and describe the relationship between access and security (e.g., active and passive data, convenience, data mining, digital marketing, online wallets, privacy, theft of personal information)	Chapter 1, Lessons 4, 5 Supplemental Chapter 3, Lesson 1
CSPG.Y2.10.4	Identify the ethical implications encountered in the curation, management, and monetization of data (e.g., harvesting, information overload, knowledge management repositories, sharing, summarizing)	
CSPG.Y3.10.4	Discuss ethical implications encountered in software development industry that relate to intellectual property, non-compete clauses, and non-disclosure agreements	
N/A	*This standard does not start until a later year*	Chapter 27 Supplemental Chapter 2, Lesson 1
CSPG.Y2.10.5	Explain advantages and disadvantages of various software life cycle processes (e.g., Agile, spiral, waterfall)	
CSPG.Y3.10.5	Utilize a software life cycle process (e.g., Agile, spiral, waterfall) in developing a program	
CSPG.Y1.10.6	Research the history of computing devices and their impact on society	Chapter 1, Lesson 1 Supplemental Chapter 3
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

CSPG.Y1.10.7	Research and identify diverse careers and career opportunities (e.g., accessibility, availability, demand) that are influenced by computer science and the technical and soft skills needed for each	Chapter 27 Supplemental Chapter 2, Lessons 2, 3
CSPG.Y2.10.7	Demonstrate industry-relevant technical and soft skills	
N/A	*Continuation not specified at this level*	
N/A	*This standard does not start until a later year*	Supplemental Chapter 2, Lesson 2
CSPG.Y2.10.8	Identify the components of a quality professional digital portfolio	
CSPG.Y3.10.8	Evaluate the quality and impact of a professional digital portfolio	
N/A	*This standard does not start until a later year*	Students create multiple projects throughout the course
CSPG.Y2.10.9	Create and maintain a digital collection of self-created work	
CSPG.Y3.10.9	Create and maintain a professional digital portfolio comprised of self-created work	

Strand: Professionalism and Impacts of Computing **Content Cluster 11: Students will demonstrate understanding of storytelling with data and appropriately communicate about technical**		**CITATION(S)**
CSPG.Y1.11.1	Communicate basic technical information effectively to diverse audiences, including but not limited to, non-technical audience members	Chapter 27 Supplemental Chapter 1, Lesson 2 Supplemental Chapter 2, Lessons 1, 4
CSPG.Y2.11.1	Communicate technical information, of appropriate complexity, effectively to diverse audiences including, but not limited to, non-technical audience members	
CSPG.Y3.11.1	Communicate technical information, of appropriate complexity, effectively to diverse audiences including, but not limited to, non-technical audience members	
CSPG.Y2.11.2	Describe and utilize the concepts of storytelling with data	Supplemental Chapter 1, Lesson 4
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	

CSPG.Y1.11.3	Describe the following common types of data bias: * Confirmation bias * Confounding variables * Outliers * Overfitting/underfitting * Selection bias	N/A
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.11.4	Compare and contrast causation and correlation	N/A
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	
CSPG.Y1.11.5	Compare and contrast interpreting data, inferring using data, and implicating with data	N/A
N/A	*Continuation not specified at this level*	
N/A	*Continuation not specified at this level*	