# CompuScholar, Inc.

## Alignment to Nevada **"Computer Science"** Course Standards

**Nevada Course Details:**

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| **Course Name:** | Computer Science |
| **Primary Cluster:** | Information Technology |
| **CIP Code(s):** | 11.0701 |
| **Credit:** | 1 |
| **Grade Level:** | 9th-12th |
| **Program Standards Link:** | Program Standards - Computer Science (2018) |
| **Framework Link:** | Curriculum Frameworks - Computer Science (2018) |

**CompuScholar Course**

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| **Course Title:** | Java Programming (Abridged) |
| **Course ISBN:** | 978-0-9887070-4-7 |
| **Course Year:** | 2019 |

**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.

## Course Description

CompuScholar's "Java Programming (Abridged)" is a computer science course based on the Java language. This document demonstrates how the course meets standards within the Nevada Computer Science sequence. The Nevada standards listed below represent a 3-year / 3-Level program (L1, L2, L3) and different performance indicators apply to different levels. The applicable level is marked next to each citation.

"Java Programming (Abridged)" is a 1-year course that can be flexibly applied to any chosen Nevada "level" at the discretion of the local school or district.

## Course Standards

| CONTENT STANDARD 1.0 : UNDERSTAND ALGORITHMS AND PROGRAMMING | CITATION(S) | LEVEL(S) |
|---|---|---|
| **PERFORMANCE STANDARD 1.1 : APPLY ALGORITHMS** | | |
| 1.1.1 Create prototypes that use algorithms to solve computational problems by leveraging prior student knowledge and personal interests | Chapter 17, Lesson 4<br>Chapter 19, Lesson 2<br>Chapter 21 | 1 |
| 1.1.2 Describe how artificial intelligence drives many software and physical systems | Suppl. Chapter 3, Lesson 3 | 2 |
| 1.1.3 Implement an artificial intelligence algorithm to play a game against a human opponent or solve a problem | Chapter 21 (student-directed project can accommodate this topic). | 2 |

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| 1.1.4 Use and adapt classic algorithms to solve computational problems | Chapter 17, Lesson 4<br>Chapter 19, Lessons 2 - 3 | 2 |
| 1.1.5 Develop classic algorithms in code to solve computational problems | Chapter 17, Lesson 4<br>Chapter 19, Lessons 2 - 3 | 2, 3 |
| 1.1.6 Evaluate algorithms in terms of their efficiency, correctness, and clarity | Chapter 19 | 3 |
| **PERFORMANCE STANDARD 1.2 : IMPLEMENT CONTROLS** | | |
| 1.2.1 Justify the selection of specific control structures when tradeoffs involve implementation, readability, and program performance, and explain the benefits and drawbacks of choices made | Chapter 7<br>Chapter 14<br>Suppl. Chapter 1, Lesson 6 | 1 |
| 1.2.2 Design and iteratively develop computational artifacts for practical intent, personal expression, or to address a societal issue by using events to initiate instructions | Chapter 21 (student-directed project with full SDLC). | 1, 2 |
| 1.2.3 Illustrate the flow of execution of a recursive algorithm | Chapter 19, Lesson 1 | 3 |
| 1.2.4 Implement conditional controls in code | Chapter 7 | 3 |
| 1.2.5 Implement recursive algorithms in code | Chapter 14, Lesson 1 | 3 |
| **PERFORMANCE STANDARD 1.3 : UTILIZE VARIABLES** | | |
| 1.3.1 Demonstrate the use of both linked lists and arrays to simplify solutions, generalizing computational problems instead of repeatedly using simple variables | Chapter 14 | 1 |
| 1.3.2 Compare and contrast fundamental data structures and their uses | Chapter 14<br>Suppl. Chapter 1, Lesson 6 | 1 |
| 1.3.3 Implement arrays in code | Chapter 14, Lessons 1 - 2 | 2, 3 |
| 1.3.4 Implement ArrayLists and LinkedLists in code | Chapter 14, Lessons 3 - 4 | 2, 3 |
| **PERFORMANCE STANDARD 1.4 : CONSTRUCT SOLUTIONS USING MODULARITY** | | |
| 1.4.1 Decompose problems into smaller components through systematic analysis, using constructs such as procedures, modules, and/or objects | Chapters 8, 10, 11, 15, 16 | 1 |
| 1.4.2 Create artifacts by using procedures within a program, combinations of data and procedures, or independent but interrelated programs | Chapter 8 | 1 |
| 1.4.3 Construct solutions to problems using student-created components, such as procedures, modules and/or objects | Chapters 8, 10, 11, 15, 16, 21 | 2 |
| 1.4.4 Analyze a large-scale computational problem and identify generalizable patterns that can be applied to a solution | Chapter 19, Lessons 2 - 3<br>Chapter 21 (student-directed project) | 2 |
| 1.4.5 Demonstrate code reuse by creating programming solutions using libraries and APIs | Java class library used throughout the course | 2, 3 |

| PERFORMANCE STANDARD 1.5 : DEMONSTRATE PROGRAMMING AND DEVELOPMENT | | |
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| 1.5.1 Systematically design and develop programs for broad audiences by incorporating feedback from users | Chapter 21 (student-directed project includes feedback)<br>Suppl. Chapter 2, Lesson 1 | 1 |
| 1.5.2 Evaluate licenses that limit or restrict the use of computational artifacts when using resources such as libraries | Chapter 1, Lesson 4 | 1 |
| 1.5.3 Evaluate and refine computational artifacts to make them more usable by all and accessible to people with disabilities | N/A<br>(See our Web Design course) | 1 |
| 1.5.4 Design and develop computational artifacts while working in team roles and using collaborative tools | Chapter 21<br>Suppl. Chapter 3, Lesson 4 | 1 |
| 1.5.5 Document design decisions using text, graphics, presentations, and/or demonstrations in the development of complex programs | Chapter 21<br>Suppl. Chapter 2, Lesson 1 | 1 |
| 1.5.6 Plan and develop programs for broad audiences using a software life cycle process | Chapter 21<br>Suppl. Chapter 2, Lesson 1 | 2 |
| 1.5.7 Explain security issues that might lead to compromised computer programs | Chapter 1, Lesson 5 | 2 |
| 1.5.8 Develop programs for multiple computing platforms | N/A<br>(See our Java course) | 2 |
| 1.5.9 Use version control systems, integrated development environments (IDEs), and collaborative tools and practices (code documentation) in a group software project | Chapter 21<br>Eclipse IDE used throughout the course | 2 |
| 1.5.10 Develop and use a series of test cases to verify that a program performs according to its design specifications | Chapter 21<br>Suppl. Chapter 2, Lesson 1 | 2 |
| 1.5.11 Modify an existing program to add additional functionality and discuss intended and unintended implications, e.g., breaking other functionality | Chapter 21, Lesson 4 (project includes regression testing) | 2 |
| 1.5.12 Evaluate key qualities of a program through a process such as a code review | Chapter 9, Lesson 3 | 3 |
| 1.5.13 Compare multiple programming languages and discuss how their features make them suitable for solving different types of problems | Chapter 1, Lesson 3 | 3 |

| CONTENT STANDARD 2.0 : UNDERSTAND COMPUTING SYSTEMS | CITATION(S) | LEVEL(S) |
|---|---|---|
| **PERFORMANCE STANDARD 2.1 : DESCRIBE DEVICES** | | |
| 2.1.1 Explain how abstractions hide the underlying implementation details of computing systems embedded in everyday objects | Chapter 1, Lessons 1 - 2 | 1 |

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| **PERFORMANCE STANDARD 2.2 : COMPARE HARDWARE AND SOFTWARE** | | |
| 2.2.1 Compare levels of abstraction and interactions between application software, system software, and hardware layers | Chapter 1, Lesson 2 | 1 |
| 2.2.2 Categorize the roles of operating system software | Chapter 1, Lesson 2 | 2 |
| **PERFORMANCE STANDARD 2.3 : EXPLAIN TROUBLESHOOTING** | | |
| 2.3.1 Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors | Chapter 9 | 1 |
| 2.3.2 Illustrate ways computing systems implement logic, input, and output through hardware components | Chapter 1, Lesson 1 | 2 |

| CONTENT STANDARD 3.0 : UNDERSTAND DATA AND ANALYSIS | **CITATION(S)** | **LEVEL(S)** |
|---|---|---|
| **PERFORMANCE STANDARD 3.1 : EVALUATE STORAGE SOLUTIONS** | | |
| 3.1.1 Translate between different bit representations of real-world phenomena, such as characters, numbers, and images, e.g., convert hexadecimal colors to decimal percentages, ASCII/Unicode representation | Chapter 17, Lesson 2<br>Suppl. Chapter 1, Lesson 1 | 1 |
| 3.1.2 Evaluate the tradeoffs in how data elements are organized and where data is stored | Chapter 14<br>Suppl. Chapter 1, Lesson 6 | 1 |
| 3.1.3 Demonstrate the ability to store bit representation of real-world phenomena, characters, numbers, and images | Chapter 17, Lesson 2<br>Suppl. Chapter 1, Lesson 1 | 2 |
| **PERFORMANCE STANDARD 3.2 : CREATE USING COLLECTION, VISUALIZATION, AND TRANSFORMATION** | | |
| 3.2.1 Create interactive data visualizations or alternative representations using software tools to help others better understand real-world phenomena | Chapter 21 (student-directed topics)<br>Suppl. Chapter 1, Lesson 5 | 1 |
| 3.2.2 Use data analysis tools and techniques to identify patterns in data representing complex systems | Suppl. Chapter 1, Lesson 5 | 1 |
| 3.2.3 Select data collection tools and techniques to generate data sets that support a claim or communicate information | Suppl. Chapter 1, Lesson 5 | 3 |
| **PERFORMANCE STANDARD 3.3 : CREATE USING INFERENCE AND MODELS** | | |
| 3.3.1 Create computational models that represent the relationships among different elements of data collected from a phenomenon, process, or model | Chapter 21 (student-directed topics)<br>Suppl. Chapter 1, Lesson 5 | 1 |
| 3.3.2 Evaluate the ability of models and simulations to test and support the refinement of hypotheses | Suppl. Chapter 1, Lesson 5 | 3 |

| CONTENT STANDARD 4.0 : UNDERSTAND IMPACTS OF COMPUTING | CITATION(S) | LEVEL(S) |
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| **PERFORMANCE STANDARD 4.1 : EVALUATE THE IMPACT OF COMPUTING ON CULTURE** | | |
| 4.1.1 Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices | Suppl. Chapter 3 | 1 |
| 4.1.2 Test and refine computational artifacts to reduce bias and equity deficits | N/A | 1 |
| 4.1.3 Demonstrate ways a given algorithm applies to problems across disciplines | Chapter 17, Lesson 4 | 1 |
| 4.1.4 Explain the potential impacts of artificial intelligence on society | Suppl. Chapter 3, Lesson 3 | 1 |
| 4.1.5 Evaluate computational artifacts to maximize their beneficial effects and minimize harmful effects on society | Suppl. Chapter 3, Lessons 1 - 2 | 2 |
| 4.1.6 Create computational artifacts to maximize their beneficial effects and minimize harmful effects on society | Chapter 1, Lesson 4 | 3 |
| 4.1.7 Evaluate the impact of equity, access, and influence on the distribution of computing resources in a global society | N/A (see Digital Savvy) | 3 |
| 4.1.8 Predict how computational innovations that have revolutionized aspects of our culture might evolve | Suppl. Chapter 3, Lesson 2 | 3 |
| **PERFORMANCE STANDARD 4.2 : INCREASE SOCIAL INTERACTIONS** | | |
| 4.2.1 Use tools and methods for collaboration on a project to increase connectivity of people in different cultures and career fields | Chapter 21<br>Suppl. Chapter 3, Lesson 4 | 1 |
| 4.2.2 Use tools and methods for collaboration to increase the productivity of a team | Chapter 21<br>Suppl. Chapter 3, Lesson 4 | 3 |
| **PERFORMANCE STANDARD 4.3 : EXPLAIN SAFETY, LAW, AND ETHICS RELATED TO COMPUTING** | | |
| 4.3.1 Explain the beneficial and harmful effects that intellectual property laws can have on innovation | Chapter 1, Lesson 4 | 1 |
| 4.3.2 Explain the privacy concerns related to the collection and generation of data through automated processes that may not be evident to users | Suppl. Chapter 3, Lesson 1 | 1 |
| 4.3.3 Evaluate the social and economic implications of privacy in the context of safety, law, or ethics | Chapter 1, Lessons 4 - 5 | 1 |
| 4.3.4 Discuss the role of ethics in emerging technologies | Chapter 1, Lesson 4<br>Suppl. Chapter 3, Lessons 2 - 3 | 2 |
| 4.3.5 Debate laws and regulations that impact the development and use of software | Chapter 1, Lessons 4 - 5 | 3 |

| CONTENT STANDARD 5.0 : UNDERSTAND NETWORKS AND THE INTERNET | CITATION(S) | LEVEL(S) |
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| **PERFORMANCE STANDARD 5.1 : EVALUATE NETWORK, COMMUNICATION, AND ORGANIZATION** | | |
| 5.1.1 Evaluate the scalability and reliability of networks, by describing the relationship between routers, switches, servers, topology, and addressing | Suppl. Chapter 1, Lessons 2 - 4 | 1 |
| 5.1.2 Describe the issues that impact network functionality, e.g., bandwidth, load, delay, topology | Suppl. Chapter 1, Lessons 2 - 4 | 3 |
| **PERFORMANCE STANDARD 5.2 : DESCRIBE CYBERSECURITY** | | |
| 5.2.1 Illustrate how sensitive data can be affected by malware and other attacks | Chapter 1, Lesson 5 | 1 |
| 5.2.2 Recommend security measures to address various scenarios based on factors such as efficiency, feasibility, and ethical impacts | Chapter 1, Lesson 5 | 1 |
| 5.2.3 Compare various security measures, considering tradeoffs between the usability and security of a computing system | Chapter 1, Lesson 5 | 1 |
| 5.2.4 Explain tradeoffs when selecting and implementing cybersecurity recommendations | Chapter 1, Lesson 5 | 1 |
| 5.2.5 Compare ways software developers protect devices and information from unauthorized access | Chapter 1, Lesson 5 | 3 |

## Employability Skills for Career Readiness Standards

| CONTENT STANDARD 1.0: DEMONSTRATE EMPLOYABILIITY SKILLS FOR CAREER READINESS | CITATION(S) | LEVEL(S) |
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| **PERFORMANCE STANDARD 1.1: DEMONSTRATE PERSONAL QUALITIES AND PEOPLE SKILLS** | | |
| 1.1.1 Demonstrate a positive work ethic by coming to work every day on time, a willingness to take direction, and motivation to accomplish the task at hand | Chapter 21 (Team project with team roles & deliverables) Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |
| 1.1.2 Demonstrate integrity by abiding by workplace policies and laws and demonstrating honesty and reliability | Chapter 21 (Team project with team roles & deliverables) Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |
| 1.1.3 Demonstrate teamwork skills by contributing to the success of the team, assisting others, and requesting help when needed | Chapter 21 (Team project with team roles & deliverables) Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |
| 1.1.4 Demonstrate positive self-representation skills by dressing appropriately and using language and manners suitable for the workplace | Chapter 21 (Team project with team roles & deliverables) Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |
| 1.1.5 Demonstrate diversity awareness by working well with all customers and coworkers | Chapter 21 (Team project with team roles & deliverables) Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |

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| 1.1.6 Demonstrate conflict-resolution skills by negotiating diplomatic solutions to interpersonal and workplace issues | Chapter 21 (Team project with team roles & deliverables)<br>Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |
| 1.1.7 Demonstrate creativity and resourcefulness by contributing new ideas and working with initiative | Chapter 21 (Team project with team roles & deliverables) | 1, 2, 3 |
| **PERFORMANCE STANDARD 1.2: DEMONSTRATE PROFESSIONAL KNOWLEDGE AND SKILLS** | | |
| 1.2.1 Demonstrate effective speaking and listening skills by communicating effectively with customers and employees and following directions | Multiple opportunities to speak, listen and follow directions | 1, 2, 3 |
| 1.2.2 Demonstrate effective reading and writing skills by reading and interpreting workplace documents and writing clearly | Multiple opportunities to read and write technical documents | 1, 2, 3 |
| 1.2.3 Demonstrate critical-thinking and problem-solving skills by analyzing and resolving problems that arise in completing assigned tasks | Hands-on tasks are completed throughout the course | 1, 2, 3 |
| 1.2.4 Demonstrate healthy behaviors and safety skills by following safety guidelines and managing personal health | N/A (See Digital Savvy) | 1, 2, 3 |
| 1.2.5 Demonstrate understanding of workplace organizations, systems, and climates by identifying “big picture” issues and fulfilling the mission of the workplace | Suppl. Chapter 2, Lessons 1 - 2 | 1, 2, 3 |
| 1.2.6 Demonstrate lifelong-learning skills by continually acquiring new industry-related information and improving professional skills | Suppl. Chapter 2, Lessons 2 - 3 | 1, 2, 3 |
| 1.2.7 Demonstrate job acquisition and advancement skills by preparing to apply for a job and seeking promotion | Suppl. Chapter 2, Lesson 2 | 1, 2, 3 |
| 1.2.8 Demonstrate time, task, and resource management skills by organizing and implementing a productive plan of work | Chapter 21<br>Suppl. Chapter 2, Lesson 1 | 1, 2, 3 |
| 1.2.9 Demonstrate mathematics skills by using mathematical reasoning to accomplish tasks | Chapter 7<br>Chapter 17 | 1, 2, 3 |
| 1.2.10 Demonstrate customer service skills by identifying and addressing the needs of all customers and providing helpful, courteous, and knowledgeable service | N/A (See Digital Savvy) | 1, 2, 3 |
| **PERFORMANCE STANDARD 1.3 : DEMONSTRATE TECHNOLOGY KNOWLEDGE AND SKILLS** | | |
| 1.3.1 Demonstrate proficiency with job-specific technologies by selecting and safely using technological resources to accomplish work responsibilities in a productive manner | Technical resources used throughout the course | 1, 2, 3 |
| 1.3.2 Demonstrate proficiency with information technology by using computers, file management techniques, and software/programs effectively | Computers, file management and software used throughout the course | 1, 2, 3 |
| 1.3.3 Demonstrate proper Internet use and security by using the Internet appropriately for work | Internet used safely and securely to access online course material | 1, 2, 3 |
| 1.3.4 Demonstrate proficiency with telecommunications by selecting and using appropriate devices, services, and applications | Appropriate devices and applications used throughout the course | 1, 2, 3 |