Idaho Computer Science

Grades 9-12

COMPUTING SYSTEMS

1. Identify and describe hardware components. 9-12.CS.1.1
2. Identify and evaluate what computing system resources are required for a specific software program. 9-12.CS.1.2
3. Identify the use of embedded computers in various applications. 9-12.CS.1.3
4. Create or modify a program that uses different forms of input and output. 9-12.CS.1.4
5. Identify how a high level programming language abstracts machine language in a computer program. 9-12.CS.1.5
6. Create a model of how embedded systems sense, process, and interact in a given environment. 9-12.CS.1.6

DATA AND ANALYSIS

1. Use applicable data collection techniques for various scenarios. 9-12.CS.2.1
2. Apply basic techniques for locating, collecting, and understanding the quality of data sets. 9-12.CS.2.2
3. Analyze data and identify patterns through modeling and simulation. 9-12.CS.2.3
4. Use data analysis to show the transformation from data to information to knowledge. 9-12.CS.2.4
5. Use models and simulations to help formulate, refine, and test scientific hypotheses. 9-12.CS.2.5
6. Compare and contrast the viewpoints on cybersecurity from the perspective of security experts, privacy advocates, and the government. 9-12.CS.2.6
7. Analyze the strengths and weaknesses of security policies based on their usage of encryption and authentication strategies. 9-12.CS.2.7
8. Convert between binary, decimal, octal, and hexadecimal representations of data. 9-12.CS.2.8
9. Describe how real-world phenomena such as numbers, Strings, or images are represented as binary in a computer. 9-12.CS.2.9

	10 **Analyze the trade-offs among various compression algorithms.** 9-12.CS.2.10
IMPACTS OF COMPUTING	1 **Demonstrate responsible digital citizenship (legal and ethical behaviors) in the use of technology systems and software.** 9-12.CS.3.1
	2 **Explain the social and economic implications associated with unethical computing practices.** 9-12.CS.3.2
	3 **Discuss trade-offs such as privacy, safety, and convenience associated with the collection and large-scale analysis of personal information.** 9-12.CS.3.3
	4 **Identify and evaluate the beneficial and harmful effects of computing innovations on behavior and culture.** 9-12.CS.3.4
	5 **Debate how the issues of equity, data access, and distribution of computing resources create a digital divide in a global society.** 9-12.CS.3.5
	6 **Debate laws and regulations that impact the development, security and use of software.** 9-12.CS.3.6
	7 **Understand and define artificial intelligence.** 9-12.CS.3.7
	8 **Research and explain the social, moral, ethical, and legal impacts of artificial intelligence systems and respective usage.** 9-12.CS.3.8
	9 **Explain how computer automation continues to transform society and the global economy (e.g. financial markets, transactions, predictions).** 9-12.CS.3.9
	10 **Research, analyze, and present how computational thinking has enabled computing to revolutionize business, manufacturing, commerce and society.** 9-12.CS.3.10
	11 **Evaluate the accessibility of a computational artifact.** 9-12.CS.3.11
	12 **Describe how computer science shares features with creating and designing an artifact such as in music and art.** 9-12.CS.3.12
	13 **Understand the ecosystem of open- source software development and its impact on global collaboration.** 9-12.CS.3.13
	14 **Explain how computer science fosters innovation and enhances other career and disciplines.** 9-12.CS.3.14
NETWORKS AND THE INTERNET	1 **Illustrate the basic components of computer networks and protocols.** 9-12.CS.4.1
	2 **Analyze the issues that impact network functionality.** 9-12.CS.4.2
	3 **Describe the data flow that occurs when using Internet-based services.** 9-12.CS.4.3

	4 **Examine how encryption is essential to ensuring privacy and security over the internet.** 9-12.CS.4.4
ALGORITHMS AND PROGRAMMING	1 **Diagram the flow of execution and output of a given program.** 9-12.CS.5.1
	2 **Design algorithms using sequence, selection, iteration and recursion.** 9-12.CS.5.2
	3 **Use variable scope and encapsulation to design programs with cohesive and modular components.** 9-12.CS.5.3
	4 **Decompose a complex problem using abstraction through methods and/or classes.** 9-12.CS.5.4
	5 **Demonstrate the value of abstraction to manage problem complexity.** 9-12.CS.5.5
	6 **Demonstrate code reuse by creating programming solutions using APIs and libraries.** 9-12.CS.5.6
	7 **Evaluate the qualities of a program such as correctness, usability, readability, efficiency, portability and scalability through processes such as debugging and code review.** 9-12.CS.5.7
	8 **Compare and contrast simple data structures and their uses.** 9-12.CS.5.8
	9 **Compare software development processes.** 9-12.CS.5.9
	10 **Demonstrate an understanding of the software life cycle process.** 9-12.CS.5.10
	11 **Design and develop a software artifact by leading, initiating, and participating in a team.** 9-12.CS.5.11
	12 **Create collaborative software projects using Integrated Development Environments, or other collaborative tools.** 9-12.CS.5.12
	13 **Understand the positive and negative implications that arise when you add functionality to an existing program.** 9-12.CS.5.13
	14 **Demonstrate how diverse team collaboration improves the design and development of software products.** 9-12.CS.5.14
	15 **Compare a variety of programming languages available to solve problems and develop systems.** 9-12.CS.5.15
	16 **Analyze security issues that might lead to compromised computer programs.** 9-12.CS.5.16
	17 **Classify and define the different types of software licenses in order to understand how to apply each one to a specific software example.** 9-12.CS.5.17

18 **Analyze the notion of intelligent behavior through the programs that learn and adapt, play games, do image recognition, perform text analysis, and control the behavior of robots.** 9-12.CS.5.18

19 **Illustrate how mathematical and statistical functions, sets, and logic are used in computation.** 9-12.CS.5.19

20 **Describe the concept of parallel processing.** 9-12.CS.5.20

21 **Explore issues surrounding mobile computing.** 9-12.CS.5.21

22 **Explain the value of heuristic algorithms to approximate solutions for interactable problems.** 9-12.CS.5.22

23 **Critically examine algorithms and design an original algorithm (e.g. adapt, remix, improve).** 9-12.CS.5.23

24 **Classify problems as tractable, interactable, or computationally unsolvable.** 9-12.CS.5.24