Computer Science Evaluation Tool

2021 Curricular Materials Review

Grades 9 – 12 Computer Science[[1]](#footnote-1)

**Publisher information**

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**Instructions:**

Publishing Company:

* Complete the course evaluation form below. Please provide written justification as to how the material meets the standard along with location references. If a justification requires additional space, please submit response on an additional document.

Review Team Member:

* Please use information and attachments to complete the course evaluation form.
* Explain any discrepancies between your findings and those provided information. Explanations and comments should directly reflect the rubric.
* Further, explain any findings.

# Scoring:

* 0 = No Alignment – Not Evident: content as described in the Standards is not evident.
* .5 = Partial Alignment – Partially Evident: content as described in the Standards is partially evident and there are few gaps.
* 1 = High Alignment – Clearly Evident: content is fully aligned as described in the Standards and repeatedly included to guarantee extensive opportunities for students to work with the content. Alignment is clearly evident.
* N/A = Not applicable for standard.

# Standards alignment evaluation rubric:

## Standard 1: Computing Systems (CS)

| Performance Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 9-10.CS.01: Identify and evaluate what computing resources are required for a given purpose (e.g. system requirements needed to run a program, hardware, and software needed to run game X). (Grades 9-10) |  |  |
| 9-10.CS.02: Explore the unique features of embedded computers in areas such as mobile devices, sensors, and vehicles. (Grades 9-10) |  |  |
| 9-10.CS.03: Create or modify a program that uses different forms of input and output. (e.g. use voice input instead of text input, use text-to-speech for output) (Grades 9-10) |  |  |
| 9-10.CS.04: Demonstrate the multiple levels of abstraction that support program execution including programming languages, translations, and low-level systems including the fetch-execute cycle (e.g. model, dance, create a play/presentation). (Grades 9-10) |  |  |
| 11-12.CS.01: Identify and describe hardware (e.g. physical layers, logic gates, chips, components). (Grades 11-12) |  |  |
| 11-12.CS.02: Create a model of how embedded systems sense, process, and actuate in a given environment (e.g. ocean, atmosphere, and highway) (Grades 11-12) |  |  |

## Standard 2: Data Analysis (DA)

| Performance Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 9-10.DA.01: Illustrate how various types of data are stored in a computer system (e.g. how sound and images are stored). (Grades 9-10) |  |  |
| 9-10.DA.02: Differentiate between information access and distribution rights (e.g. write, discuss). (Grades 9-10) |  |  |
| 9-12.DA.03: Compare and contrast the viewpoints on cybersecurity from the perspective of security experts, privacy advocates, the government (e.g. persuasive essay, presentation, or debate). (Grades 9-12) |  |  |
| 9-12.DA.04: Explain the principles of security by examining encryption, cryptography, and authentication techniques. (Grades 9-12) |  |  |
| 9-10.DA.05: Apply basic techniques for locating, collecting, and understanding the quality of small- and large-scale data sets (e.g. public data sets). (Grades 9-10) |  |  |
| 9-10.DA.06: Convert between binary, decimal, octal, and hexadecimal representations of data. (Grades 9-10) |  |  |
| 9-10.DA.07: Analyze the representation and trade-offs among various forms of digital information (e.g. lossy versus lossless compression). (Grades 9-10) |  |  |
| 9-12.DA.08: Analyze data and identify patterns through modeling and simulation.(Grades 9-12) |  |  |
| 11-12.DA.01: Use data analysis to enhance understanding and gain knowledge of complex systems to show the transformation from data to information to knowledge (e.g. using existing data sets). (Grades 11-12) |  |  |
| 11-12.DA.02: Use various data collection techniques for different types of problems (e.g. mobile device GPS, user surveys, embedded system sensors, open data sets, social media data sets). (Grades 11-12) |  |  |
| 11-12.DA.03: Understand and explain security policies by comparing encryption and authentication strategies (e.g. trapdoor functions and man-in-the-middle attacks). (Grades 11-12) |  |  |
| 11-12.DA.04: Discuss the variety of interpretations of binary sequences (e.g. instructions, numbers, text, sound, image). (Grades 11-12) |  |  |
| 11-12.DA.05: Use models and simulations to help formulate, refine, and test scientific hypotheses. (Grades 11-12) |  |  |

## Standard 3: Impacts of Computing (IC)

| Performance Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 9-10.IC.01: Explain the social and economic implications associated with unethical computing practices (e.g. software piracy, intrusion, malware, current corporate fraud examples). (Grades 9-10) |  |  |
| 9-10.IC.02: Discuss trade-offs such as privacy, safety, and convenience associated with the collection and large scale analysis of information about individuals (e.g. social media, online shopping, how grocery/dept. stores collect and use personal data). (Grades 9-10) |  |  |
| 9-10.IC.03: Understand and explain the impact of artificial intelligence and robotics. (Grades 9-10) |  |  |
| 9-12.IC.04: Describe how computer science shares features with creating and designing an artifact such as in music and art. (Grades 9-12) |  |  |
| 9-10.IC.05: Demonstrate how computing enhances traditional forms and enables new forms of experience, expression, communication, and collaboration (e.g. virtual reality). (Grades 9-10) |  |  |
| 9-10.IC.06: Explain the impact of the digital divide on access to critical information (e.g. education, healthcare, medical records, access to training). (Grades 9-10) |  |  |
| 9-10.IC.07: Compare the positive and negative impacts of computing on behavior and culture. (Grades 9-10) |  |  |
| 9-10.IC.08: Evaluate a computational artifact for its effectiveness for universal access (e.g. compare sample code with accessibility standards, building in access from initial design). (Grades 9-10) |  |  |
| 9-10.IC.09: Practice responsible digital citizenship (legal and ethical behaviors) in the use of technology systems and software. (Grades 9-10) |  |  |
| 9-10.IC.10: Explain how computer science fosters innovation and enhances other careers and disciplines. (Grades 9-10) |  |  |
| 9-12.IC.11: Explain the impacts of computing on business, manufacturing, commerce, and society. (Grades 9-12) |  |  |
| 11-12.IC.01: Understand the ecosystem of open source software development and its impact on global collaboration through an open-source software project (e.g. https://codein.withgoogle.com). (Grades 11-12) |  |  |
| 11-12.IC.02: Debate laws and regulations that impact the development and use of software. (e.g. compare and contrast licensing versus certification, professional societies, professional code of ethics). (Grades 11-12) |  |  |
| 11-12.IC.03: Research, analyze, and present how computational thinking has revolutionized an aspect of our culture (e.g. agriculture, communication, work, healthcare, music, art). (Grades 11-12) |  |  |
| 11-12.IC.04: Analyze the role and impact of government regulation on privacy and security. (Grades 11-12) |  |  |
| 11-12.IC.05: Debate how the issues of equity, access, and power relate to the distribution of computing resources in a global society. (Grades 11-12) |  |  |
| 11-12.IC.06: Identify and evaluate the beneficial and harmful effects of computing innovations. (Grades 11-12) |  |  |
| 11-12.IC.07: Practice responsible digital citizenship (legal and ethical behaviors) in the use of technology systems and software. (Grades 11-12) |  |  |
| 11-12.IC.08: Describe how computer science shares features with creating and designing an artifact such as in music and art. (Grades 9-12) |  |  |
| 11-12.IC.09: Explain the impacts of computing on business, manufacturing, commerce, and society. (Grades 9-12) |  |  |
| 11-12.IC.10: Summarize how computer automation and control is transforming society and the global economy (e.g. financial markets, transactions, predictions). (Grades 11-12) |  |  |

## Standard 4: Networks and the Internet (NI)

| Performance Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 9-10.NI.01: Describe the underlying process of Internet-based services. (e.g., illustrate how information flows in a global network, servers and clients, cloud services, secure versus insecure communication). (Grades 9-10) |  |  |
| 9-10.NI.02: Illustrate the basic components of computer networks, protocols and routing (e.g. team-based activities, which may include drawing a diagram of a network including routers, switches, local networks, and end user computing devices, creating models with string and paper; see CS unplugged activities). (Grades 9-10) |  |  |
| 11-12.NI.01: Simulate and discuss the issues that impact network functionality (e.g. use ns3 or other free network simulators). (Grades 11-12) |  |  |
| 11-12.NI.02: Examine how encryption is essential to ensuring privacy and security over the internet. (Grades 11-12) |  |  |

## Standard 5: Algorithms and Programming (AP)

| Performance Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 9-12.AP.01: Design and develop a software artifact by leading, initiating, and participating in a team (e.g. pair programming, agile software development). (Grades 9-12) |  |  |
| 9-12.AP.02: Demonstrate how diverse collaboration, both inside and outside of a team, impacts the design and development of software products (e.g. students show their own artifacts and demonstrate and reflect how diverse collaboration made a product better). (Grades 9-12) |  |  |
| 9-10.AP.03: Compare a variety of programming languages available to solve problems and develop systems. (Grades 9-10) |  |  |
| 9-12.AP.04: Explore security issues that might lead to compromised computer programs (e.g. ambiguous function calls, lack of error checking of the input, buffer overflow, SQL injection attacks, denial of service attacks). (Grades 9-12) |  |  |
| 9-12.AP.05: Classify and define the different types of software licenses in order to understand how to apply each one to a specific software example. (Grades 9-12) |  |  |
| 9-10.AP.06: Understand the notion of hierarchy and abstraction in high-level languages, translation, instruction sets, and logic circuits. (Grades 9-10) |  |  |
| 9-10.AP.07: Explore issues surrounding mobile computing by creating a mobile computing application (e.g. App Inventor). (Grades 9-10) |  |  |
| 9-10.AP.08: Create software solutions by applying analysis, design, implementation and testing techniques. (Grades 9-10) |  |  |
| 9-10.AP.09: Demonstrate code reuse by creating programming solutions using APIs and libraries (e.g. using text to speech in App Inventor, using Twitter API). (Grades 9-10) |  |  |
| 9-10.AP.10: Illustrate the flow of execution and output of a given program (e.g. flow and control diagrams). (Grades 9-10) |  |  |
| 9-10.AP.11: Illustrate how mathematical and statistical functions, sets, and logic are used in computation. (Grades 9-10) |  |  |
| 9-10.AP.12: Design algorithms using sequence, selection, iteration and recursion. (Grades 9-10) |  |  |
| 9-10.AP.13: Explain, represent, and understand natural phenomena using modeling and simulation (Grade 9-10). |  |  |
| 9-10.AP.14: Describe the concept of parallel processing as a strategy to solve large problems. (Grades 9-10) |  |  |
| 9-10.AP.15: Compare and evaluate software development processes used to solve problems (e.g. waterfall, agile). (Grades 9-10) |  |  |
| 9-10.AP.16: Decompose a complex problem into simpler parts using predefined functions and parameters, classes, and methods. (Grades 9-10) |  |  |
| 9-10.AP.17: Demonstrate the value of abstraction to manage problem complexity. (Grades 9-10) |  |  |
| 9-12.AP.18: Evaluate and improve program quality using various debugging and testing methods and examine the difference between verification and validation. (Grades 9-12) |  |  |
| 9-10.AP.19: Evaluate programs written by others for readability and usability. (Grades 9-10) |  |  |
| 11-12.AP.01: Analyze the notion of intelligent behavior through programs that learn and adapt, play games, do image recognition, perform text analysis, and control the behavior of robots. (Grades 11-12) |  |  |
| 11-12.AP.02: Create collaborative software projects using version control systems, Integrated Development Environments (IDEs), and collaborative tools. (Grades 11-12) |  |  |
| 11-12.AP.03: Demonstrate an understanding of the software life cycle process (e.g. by participating on a software project team). (Grades 11-12) |  |  |
| 11-12.AP.04: Modify an existing program to add additional functionality and discus the positive and negative implications (e.g., breaking other functionality). (Grades 11-12) |  |  |
| 11-12.AP.05: Explain the value of heuristic algorithms to approximate solutions for intractable problems. (Grades 11-12) |  |  |
| 9-12.AP.06: Decompose a computational problem through data abstraction and modularity. (Grades 9-12) |  |  |
| 11-12.AP.07: Critically examine algorithms and design an original algorithm (e.g. adapt, remix, improve). (Grades 11-12) |  |  |
| 11-12.AP.08: Evaluate efficiency, correctness, and clarity of algorithms. (Grades 11-12) |  |  |
| 11-12.AP.09: Compare and contrast simple data structures and their uses (e.g. arrays, lists, stacks, queues, maps, trees, graphs). (Grades 11-12) |  |  |
| 11-12.AP.10: Decompose a problem by creating functions and classes. (Grades 11-12) |  |  |
| 9-12.AP.11: Use variable scope and encapsulation to design programs with cohesive and decoupled components. (Grades 9-12) |  |  |
| 11-12.AP.12: Classify problems as tractable, intractable, or computationally unsolvable. (Grades 11-12) |  |  |
| 11-12.AP.13: Understand and explain the use of concurrency (e.g. separate processes into threads and divide data into parallel streams, have students self sort by height). (Grades 11-12) |  |  |
| 11-12.AP.14: Evaluate the qualities of a program such as correctness, usability, readability, efficiency, portability and scalability through a process such as a code review. (Grades 11-12) |  |  |

# Indicators of quality Rubric:

Supporting Criteria

Access and Equity:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 1. Materials are provided in a way that ensures all students have the opportunity to achieve success in the program of study, including by meeting Title IX, Americans with Disabilities Act and other accessibility requirements. |  |  |
| 1. Materials and assessments are free from bias, inclusive and non-discriminatory, and offered in a way that ensures all students have the opportunity to achieve success in the program of study. |  |  |
| 1. Contains guidance to support differentiated and culturally responsive (i.e., purposefully represents diverse cultures, linguistic backgrounds, learning styles and interests) instruction in the classroom so that every student’s need are addressed by including:    1. Suggestions for how to promote equitable instruction by making connections to culture, home, neighborhood, and community as appropriate.    2. Appropriate scaffolding, interventions, and supports, including integrated and appropriate reading, writing, listening, and speaking alternatives (e.g., translations, picture support, graphic organizers) that neither sacrifice content nor avoid language development for English language learners, special needs, or below grade level readers.    3. Digital and print resources that provide various levels of readability.    4. Modifications and extensions for all students, including those performing above their grade level, to deepen understanding of the content.    5. Materials in multiple language formats. |  |  |

Student Focus:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 1. The material supports the sequential and cumulative development of foundational skills and progresses in specificity to build students’ depth of knowledge and skills. Those skills are necessary for a student’s independent comprehension of grade-level complex texts and mastery of tasks called for by the standards. |  |  |
| 1. Content and standards within the program of study are non-duplicative and vertically aligned to prepare students to transition seamlessly to the next level of education. |  |  |
| 1. The material provides many and varied opportunities for students to work with each standard within the grade level. |  |  |
| 1. The material cross-refers and integrates other content areas. |  |  |
| 1. The material has a balance of text types and lengths that encourage close, in-depth reading and rereading, analysis, comparison, and synthesis of texts. |  |  |
| 1. The material includes sufficient supplementary activities or assignments that are appropriately integrated into the text. |  |  |
| 1. The material has activities and assignments that develop problem-solving skills and foster synthesis and inquiry at both an individual and group level. |  |  |
| 1. The material has activities and assignments that reflect varied learning styles of students. |  |  |
| 1. The material includes appropriate instructional strategies. |  |  |
| 1. Project-based learning and related instructional approaches, such as problem-based, inquiry-based and challenge-based learning, are fully integrated into the material. |  |  |

Pedagogical Approach:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 1. Provides guidance for teachers throughout for how learning experiences build on each other to support students in developing a deep understanding of the content. |  |  |
| 1. Provides scaffolded supports for teachers to facilitate learning of the content so that students are increasingly responsible for making sense of the content. |  |  |
| 1. The material provides opportunities for supporting English language learners to regularly and actively participate with grade-level text. |  |  |
| 1. The material gives clear and concise instruction to teachers and students. It is easy to navigate and understand. |  |  |
| 1. Includes appropriate academic and content-specific vocabulary in the context of the learning experience that is accessible, introduced, reinforced, reviewed, and augmented with visual representations when appropriate. |  |  |
| 1. Allows teachers to access, revise, and print form digital resources (e.g., readings, labs, assessments, rubrics). |  |  |
| 1. Uses varied modes (selected, constructed, project-based, extended response, and performance tasks) of instruction-embedded pre-, formative, summative, peer, and, self-assessment measures of learning. |  |  |
| 1. Includes editable and aligned rubrics, scoring guidelines, and exemplars that provide guidance for assessing student performance and to support teachers in planning instruction and providing ongoing feedback to students. |  |  |
| 1. Provides multiple opportunities for students to demonstrate and receive feedback on performance of practices connected with their understanding of concepts. |  |  |

Presentation and Design:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 1. The material has an aesthetically appealing appearance. |  |  |
| 1. Digital and print materials are consistently formatted, visually focused, and uncluttered for efficient use. |  |  |
| 1. The material has a reasonable and appropriate balance between text and illustration. The material has grade-appropriate font size. |  |  |
| 1. The illustrations clearly cross-reference the text, are directly relevant to the content (not simply decorative), and promote thinking, discussion, and problem solving. |  |  |
| 1. Non-text content (performance clips, images, maps, globes, graphs, pictures, charts, databases, and models) are accurate and well integrated into the text. |  |  |

Technology:

| Standards | Justification: Provide examples from materials as evidence to support each response for this section. Provide descriptions, not just page numbers. | Rating (Reviewer Only): |
| --- | --- | --- |
| 1. Technology and digital media support, extend, and enhance learning experiences. |  |  |
| 1. The material has “platform neutral” technology (i.e., cloud based) and availability for networking. |  |  |
| 1. The material has a user-friendly and interactive interface allowing the user to control (shift among activities). |  |  |

For Questions Contact

Content & Curriculum

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1. [Idaho Computer Science Standards](http://www.sde.idaho.gov/academic/shared/computer-science/ICS-Computer-Science-Standards.pdf) [↑](#footnote-ref-1)