Date of Hearing: April 8, 2026

ASSEMBLY COMMITTEE ON EDUCATION
Darshana R. Patel, Chair
AB 2298 (Irwin) – As Amended March 19, 2026

SUBJECT: Pupil instruction: computer science: content standards and instructional materials

SUMMARY: Requires the Instructional Quality Commission (IQC) to consider incorporating cybersecurity skills the next time it revises the content standards or the evaluation criteria for adopted instructional materials in computer science. Specifically, **this bill**:

1) Defines cybersecurity to mean techniques to protect information and devices by preventing, detecting, and responding to attacks by threat actors.

2) Requires the IQC, the next time the computer science content standards are revised after January 1, 2027, to consider incorporating cybersecurity skills.

3) Requires the IQC, the next time the instructional materials are adopted by the State Board of Education (SBE) after January 1, 2027, to consider including cybersecurity skills in its criteria for evaluating instructional materials.

EXISTING LAW:

1) Defines "AI literacy" to mean the knowledge, skills, and attitudes associated with how artificial intelligence (AI) works, including its principles, concepts, and applications, as well as how to use AI, including its limitations, implications, and ethical considerations. (Education Code (EC) 33548)

2) Requires the IQC to ensure that the instructional materials for pupils in kindergarten or any of grades 1 to 8, inclusive, that it recommends to the SBE for adoption after January 1, 2025, include media literacy content. (EC 33548)

3) Requires the IQC to consider incorporating AI literacy content into the mathematics, science, and history-social science curriculum frameworks when those frameworks are next revised after January 1, 2025. (EC 33548)

4) Requires the IQC to ensure that the mathematics, science, and history-social science instructional materials for pupils in kindergarten or any of grades 1 to 8, inclusive, that it recommends to the SBE for adoption after January 1, 2025, include AI literacy content. (EC 33548)

5) Requires the IQC to consider developing and recommending to the SBE, on or before July 31, 2019, computer science content standards for kindergarten and grades 1 to 12 pursuant to recommendations developed by a group of computer science experts. (EC 60605.4)

6) Through regulation, authorizes holders of credentials in mathematics, business, and Instructional Technology Education (ITE), as well as holders of supplementary authorizations in computer science, to teach computer science. (California Code of Regulations, Title 5, Section 80005)

FISCAL EFFECT: Unknown

COMMENTS:

Need for the bill. The author states, "Recent years have seen a stark increase in the number and sophistication of cyber threats posed to the students in our state, underscoring the need for modernized cybersecurity education. Existing computer science content standards, last updated in 2018, include cybersecurity content, but they focus primarily on protecting information rather than identifying and preventing threats. While this foundation has value, it reflects an outdated generation of cyber risks.

Since 2018, cyberattacks have grown increasingly complex, particularly with the growth of artificial intelligence, enabling more advanced phishing schemes, social engineering, and automated attacks. As a result, our existing standards no longer align with the current cyber threat landscape. Modern cybersecurity education standards must emphasize the skills needed to identify, prevent, and respond to these increasingly sophisticated attacks.

AB 2298 addresses this gap by requiring the Instructional Quality Commission to consider including updated, more robust cybersecurity skills content focused on identifying and responding to threats into the state's computer science standards. This will ensure that, as cyber threats continue to evolve, students are equipped with the knowledge and skills needed to protect themselves and respond effectively to the modern cyber threats they face today."

Cybersecurity in current computer science standards. This bill would require the IQC to consider including content on cybersecurity in the next revision of the computer science standards and the criteria for the evaluation of instructional materials for adoption by the SBE.

California's current computer science standards, adopted by the SBE in 2018, include content on cybersecurity under the Networks and the Internet concept through the grades, as shown below. Topics covered include data protection, security threats, and mitigation strategies, with specialized, in-depth standards for high school courses.

Grade Range	Concept	Subconcept	Practice(s)
K-2	Networks & the Internet	Cybersecurity	Communicating About Computing (7.2)
K-2	Networks & the Internet	Cybersecurity	Developing and Using Abstractions (4.4)
3-5	Networks & the Internet	Cybersecurity	Recognizing and Defining Computational Problems (3.1)
3-5	Networks & the Internet	Cybersecurity	Developing and Using Abstractions (4.4)
6-8	Networks & the Internet	Cybersecurity	Recognizing and Defining Computational Problems (3.1, 3.3)
6-8	Networks & the Internet	Cybersecurity	Developing and Using Abstractions (4.4)
9-12	Networks & the Internet	Cybersecurity	Communicating About Computing (7.2)

9-12	Networks & the Internet	Cybersecurity	Recognizing and Defining Computational Problems, Developing and Using Abstractions (3.3, 4.4)
9-12 Specialty	Networks & the Internet	Cybersecurity	Creating Computational Artifacts (5.3)
9-12 Specialty	Networks & the Internet	Cybersecurity	Recognizing and Defining Computational Problems, Developing and Using Abstractions (3.3, 4.2)

For example, in grades 3-5, standard **3-5.NI.5** is described as follows:

> **Standard**:
> Describe physical and digital security measures for protecting personal information.
>
> **Descriptive Statement**:
> Personal information can be protected physically and digitally. Cybersecurity is the protection from unauthorized use of electronic data, or the measures taken to achieve this. Students identify what personal information is and the reasons for protecting it. Students describe physical and digital approaches for protecting personal information such as using strong passwords and biometric scanners. For example, students could engage in a collaborative discussion orally or in writing regarding topics that relate to personal cybersecurity issues. Discussion topics could be based on current events related to cybersecurity or topics that are applicable to students, such as the necessity of backing up data to guard against loss, how to create strong passwords and the importance of not sharing passwords, or why we should keep operating systems updated and use anti-virus software to protect data and systems. Students could also discuss physical measures that can be used to protect data including biometric scanners, locked doors, and physical backups.

The author notes that while these standards include cybersecurity as a subconcept, they focus predominantly on protecting information when sent across networks rather than identifying and preventing cybersecurity threats. The author notes that the current standards are outdated, and that the standards should equip students with the skills to identify, prevent, and respond to increasingly sophisticated threats.

Instructional materials in computer science have never been adopted. This bill requires the IQC, the next time the instructional materials in computer science are adopted by SBE after January 1, 2027, to consider including cybersecurity skills in its criteria for evaluating instructional materials. While the SBE adopts content standards for all grades, it adopts instructional materials only for Kindergarten through 8th grade.

The SBE has never adopted instructional materials for computer science. The CDE has posted some classroom-based resources to support computer science instruction on its website. These were based on recommendations from the Computer Science Strategic Implementation Plan Panel.

Instruction in cybersecurity. A national survey of more than 900 K-12 teachers, principals, and district leaders conducted by cyber.org in 2020 examined the prevalence, forms, and perceptions of cybersecurity education. The results indicated that students and educators have limited knowledge of cybersecurity, and that less than half of respondents reported that their districts or

schools offer cybersecurity education. It also found uneven access, with cybersecurity education less likely to be provided in small and high-poverty districts or in areas that lack cybersecurity companies or universities that study or offer coursework on the subject. When cybersecurity education is offered in K-12, it is typically infused into the existing, broader curriculum rather than taught as a standalone course. Educators reported that most students are not well-informed about the educational and career requirements associated with cybersecurity jobs.

Computer science standards. This bill requires the IQC to consider adding cybersecurity content to the content standards in Computer Science the next time they are revised.

The state's computer science standards define computer science education as "the study of computers and algorithmic processes, including their principles, their hardware and software designs, their applications, and their impact on society." The core concepts in computer science instruction are:

- Computing systems;
- Networks and Information systems;
- Data and Analysis;
- Algorithms and Programming; and
- Impacts of Computing;

According to the International Society for Technology in Education's (ISTE) report, *ISTE Standards for Computer Science Education,* the field of computer science will continue to rapidly evolve in sometimes unpredictable ways, and as such, plans for teaching computer science will also need the flexibility to continuously adapt.

Content Standards, Frameworks, and Model Curricula. The Legislature has vested the IQC and the SBE with the authority to develop and adopt state curriculum and instructional materials. The IQC develops curriculum frameworks in each subject by convening expert panels, developing drafts, and holding public hearings to solicit input. Changes are frequently made in response to public comment. The SBE then adopts the frameworks in a public meeting. The SBE also adopts, in a public process, instructional materials aligned to those frameworks for grades K-8. School district governing boards and charter schools then adopt instructional materials aligned to these standards and frameworks. This process has traditionally occurred on a regular schedule, giving schools a predictable timetable to plan and budget for changes to the curriculum. Local adoption of new curricula involves significant local costs, including resources for professional development.

These existing processes involve practitioners and experts who have an in-depth understanding of curriculum and instruction, including the full scope and sequence of the curriculum in each subject and at each grade level, constraints on instructional time and resources, and the relationship of curriculum to state assessments and other measures of student progress.

Curriculum development and adoption process under review. The 2025-26 budget, through AB 121 (Committee on Budget), Chapter 8, Statutes of 2025, included $1 million for a study on the

processes by which other states develop curriculum guidance, and to make recommendations about how to improve and streamline California's processes. This report is to be completed by January 1, 2027. The report is required to include, among other topics:

- The roles and responsibilities of the California Department of Education (CDE), the IQC, the SBE, the Legislature, local educational agencies (LEAs), educators, parents and guardians, and the public; and

- The processes and cycles for developing, revising, and adopting content standards, curriculum frameworks, and other instructional guidance, and how available instructional time in elementary and secondary schools is considered.

Governor's veto message states that changes to curriculum should wait until curriculum study is complete and recommendations adopted. In 2025, the Governor vetoed AB 86 (Boerner), which would have required the SBE to adopt instructional materials for health education for kindergarten through 8th grade, on or before July 1, 2028, with the following message:

> The Budget Act of 2025 authorized a Curriculum Guidance Study to evaluate and improve the current state-level curriculum guidance adoption process to improve efficiency and consistency across all content areas. Proposals like AB 86 should only be considered after this study is complete and changes to the process are adopted. In the meantime, local governing boards continue to have the authority to evaluate and select a range of materials that align with the state standards and the associated curriculum framework.

Two-house curriculum bill policies. For several Sessions, the Assembly and Senate Education Committees have adopted identical policies on curriculum measures. These policies state, in part:

- The Committee strongly discourages the introduction of measures which require, or require consideration of, modifications to state curriculum through changes to the curriculum framework, or the course of study, which require that specific curriculum be taught, or which require the development of new model curricula or any other state-adopted curriculum; and

- The Committee encourages Members to engage in the existing administrative processes for modifying state curricula. Members may wish, for example, to provide written comments or public testimony to the Instructional Quality Commission, the State Board of Education, or the Superintendent of Public Instruction. Committee staff can share a model letter to the Instructional Quality Commission. Members may also wish to engage with the Legislative Members who are appointed to serve on the Instructional Quality Commission, or to engage in the Legislature's oversight or appointment processes for this purpose.

The policies also state that bills proposing changes to the curriculum frameworks, instructional materials, or the course of study shall either request or require that the IQC consider including content not already included in the existing or draft curriculum frameworks, instructional materials, the course of study, model curricula or any other state-adopted curriculum, to be added in the next regularly scheduled revision of a framework. ***The Committee may wish to consider*** that this bill conforms to this provision.

Arguments in support. Alameda County Office of Education writes, "As students spend an increasing amount of time online, their exposure to sophisticated digital threats has reached an all-time high. By integrating cybersecurity training into the curriculum, schools can equip students with the essential skills to navigate and respond to these risks. Furthermore, embedding cybersecurity within content standards can inspire many students to pursue high-demand careers in the field.

ACOE strongly supports this bill's approach of asking the IQC and SBE to consider integrating cybersecurity skills into the computer science content standards. By utilizing the existing framework revision process, the state can ensure this instruction is consistent, age-appropriate, and keeps pace with rapidly evolving digital threats without overburdening the current curriculum."

Related legislation. AB 2097 (Berman) of the 2023-24 Session would have required that by January 1, 2026, the governing board of each school district, and the governing body of each charter school, maintaining any of grades 9 to 12 adopt a plan to offer at least one course in computer science in accordance with a specified schedule; requires that specified data about enrollment in computer science courses be reported to, and posted by, the CDE; and required the development of a computer science implementation guide. This bill was held in the Senate Appropriations Committee.

AB 1054 (Berman), of the 2023-24 Session, would have required LEAs and charter schools maintaining any of grades 9 to 12 to adopt a plan to offer at least one course in computer science education beginning in the 2025-26 school year, as specified. This bill was held in the Senate Appropriations Committee.

AB 1251 (Luz Rivas), Chapter 834, Statutes of 2023, establishes a workgroup to determine which single subject credentials should authorize the teaching of computer science, and to report recommendations to the Legislature.

AB 1853 (Berman) of the 2021-22 Session would have established the Computer Science Preservice Teacher Grant Program, administered by the CTC to award competitive grants to institutions of higher education (IHEs) to develop or expand K–12 computer science and computational thinking coursework for individuals seeking specified teaching credentials. This bill was held in the Assembly Appropriations Committee.

AB 2187 (Luz Rivas) of the 2021-22 Session would have established a UC Subject Matter Project in computer science. This bill was held in the Assembly Appropriations Committee.

AB 130 (Committee on Budget), Chapter 44, Statutes of 2021, established the Computer Science Supplementary Authorization Incentive Grant Program for the purpose of providing one-time grants to LEAs to support the preparation of credentialed teachers to earn a supplementary authorization in computer science and provide instruction in computer science coursework.

AB 128 (Committee on Budget), Chapter 21, Statutes of 2021, appropriated $5 million on a one-time basis to establish the Educator Workforce Investment Grant: Computer Science, and required the CDE to select an institution of higher education or nonprofit organizations to provide professional learning for teachers and paraprofessionals statewide in strategies for

providing high-quality instruction and computer science learning experiences aligned to the computer science content standards.

AB 498 (Quirk-Silva) of the 2021-22 Session was substantially similar to AB 1932 of the 2019-20 Session. This bill was amended into a different jurisdiction and held in the Senate Appropriations Committee.

AB 1410 (Quirk-Silva) of the 2019-2020 Session was substantially similar to AB 1932 of the 2019-20 Session. This bill was held in the Senate Appropriations Committee.

AB 1932 (Quirk-Silva) of the 2019-20 Session would have established the Computer Science Access Initiative, to improve students' access to instruction in computer science by increasing the number of teachers who are authorized and trained to provide computer science instruction in California public schools. This bill was held in the Assembly Education Committee.

AB 2309 (Berman) of the 2019-20 Session would have required the Commission on Teacher Credentialing (CTC) to develop and implement a program to award competitive grants to postsecondary educational institutions for the development of preservice credential programs for individuals seeking a teaching credential, and the expansion of programs of study for single subject or multiple subject credentialed teachers seeking a supplementary authorization in computer science. This bill was held in the Assembly Education Committee.

AB 2274 (Berman) of the 2019-20 Session would have required the CDE to annually compile and post on its website a report on computer science courses, course enrollment, and teachers of computer science courses, for the 2019-20 school year and each subsequent school year. This bill was held in the Assembly Education Committee.

AB 1967 (Luz Rivas) of the 2019-20 Session would have established a UC Subject Matter Project in Computer Science. This bill was held in the Assembly Higher Education Committee.

AB 20 (Berman) of the 2019-20 Session would have established a Computer Science Coordinator position at the CDE. This bill was held in the Assembly Appropriations Committee.

AB 52 (Berman) of the 2019-20 Session would have required the computer science strategic implementation plan to be regularly updated. This bill was held in the Assembly Appropriations Committee.

AB 182 (Luz Rivas) of the 2019-20 Session would have required the CTC to establish a workgroup, comprised of certain members, to determine if the development of a single subject computer science credential is warranted and, if so, to consider requirements for that credential. This bill was held in the Assembly Appropriations Committee.

AB 1410 (Quirk-Silva and O'Donnell) of the 2019-20 Session would have established the Computer Science Access Initiative, to provide grants to LEAs for the purpose of increasing the number of teachers authorized and trained to instruct students in computer science. This bill was held in the Assembly Appropriations Committee.

SB 675 (Chang) of the 2019-20 Session would have enacted the Computer Occupations and Developing Education (CODE) Act, pursuant to which the SBE would administer a grant

program promoting the teaching of computer science courses in the public secondary schools. This bill was held in the Senate Governmental Organization Committee.

AB 2329 (Bonilla), Chapter 693, Statutes of 2016, requires the SPI to convene a computer science strategic implementation advisory panel to develop recommendations for a computer science strategic implementation plan.

AB 2275 (Dababneh) of the 2015-16 Session would have authorized a person who holds a single subject teaching credential in business, industrial and technology education, mathematics, or science or a designated subjects career technical education teaching credential to teach courses in computer science to all students. This bill was held in the Assembly Education Committee.

AB 1539 (Hagman, 2014), Chapter 876, Statutes of 2014, requires the IQC to consider developing and recommending to the SBE, on or before July 31, 2019, computer science content standards for kindergarten and grades 1 to 12, pursuant to recommendations developed by a group of computer science experts.

AB 1764 (Olsen), Chapter 888, Statutes of 2014, states that if a school district requires more than two courses in mathematics for graduation from high school, the district may award a student up to one mathematics course credit.

REGISTERED SUPPORT / OPPOSITION:

Support

Alameda County Office of Education
California Chamber of Commerce
Electronic Frontier Foundation
Mastercard
Silicon Valley Leadership Group
Technet

Opposition

None on file

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