VIRGINIA BOARD OF EDUCATION
AGENDA ITEM

Agenda Item: U

Date: April 25, 2024

Title: First Review of the Proposed 2024 Computer Science *Standards of Learning*

Presenter: Dr. Michelle Wallace, Assistant Superintendent of Instruction

Purpose of Presentation
Action required by state or federal law or regulation (i.e., a change in law requires a change in program requirements; this is part of a regulatory action).

Executive Summary
The 2016 Virginia General Assembly approved legislation requiring that the *Standard of Learning* include computer science and computational thinking, including computer coding. As a result, the 2017 Computer Science *Standards of Learning* were developed in 2017. In accordance with the standards review cycle established in the *Code of Virginia*, the Computer Science *Standards of Learning* were scheduled for review in 2024.

The Draft 2024 Computer *Standards of Learning* being presented to the Virginia Board of Education today for first review are a comprehensive set of standards achieved through the collaboration of many stakeholders, including parents, K-12 educators, community and business members, and faculty at institutions of higher education.

The set of standards being presented represents six elementary grade levels (K-5), three middle school grade levels (6-8), and four standalone courses, including Middle School Electives, Computer Science Foundations (HS), Computer Science Principles (HS), and Computer Science Programming (HS: Non-Career Technical Education). The K-8 standards were designed for opportunities for integration with other academic content areas.

Through the engagement of a broad array of stakeholders, valuable input and feedback informed a revised set of standards that strive for excellence for all students in the Commonwealth. The proposed standards have undergone a significant revision to provide

specificity, ensure coherence, and increase rigor and relevancy. The proposed revisions aim to elevate academic standards to promote computational literacy, equip the students of the Commonwealth with the knowledge and skills to thrive in an ever-evolving technological society and be globally and nationally competitive.

Action Requested
Action will be requested at a future meeting: June 25, 2024

Superintendent's Recommendation
The Superintendent of Public Instruction recommends that the Board of Education receive for first review the proposed revisions to the 2017 Computer Science *Standards of Learning*.

Previous Review or Action
> **Date:** March 23, 2023
>
> **Action:** Report on the Timeline for the Computer Science *Standards of Learning* Review and Revision Process.

Background Information and Statutory Authority
Section 22.1-253.13:1(B) of the Code of Virginia requires a review of the Board's *Standards of Learning* every seven years:

> The Board of Education shall establish a regular schedule, in a manner it deems appropriate, for the review, and revision as may be necessary of the *Standards of Learning* in all subject areas. Such review of each subject area shall occur at least once every seven years. Nothing in this section shall be construed to prohibit the Board from conducting such review and revision on a more frequent basis.

Per the timeline presented to the Virginia Board of Education on March 23, 2023, the Virginia Department of Education (VDOE) produced a draft of the 2024 Computer Science *Standards of Learning* (found in Attachment 2).

The Draft 2024 Computer Science *Standards of Learning* is organized into content strands to illustrate domains within computer science and provide clarity for learning expectations:

- Algorithm and Programming
- Computing Systems
- Cybersecurity
- Data and Analysis

- Impacts of Computing
- Network and the Internet

This is the first revision of the Virginia Computer Science *Standards of Learning* since its adoption in 2017. This revision process entailed a comprehensive assessment of the evolving landscape of K-12 computer science education. A central goal in the revision process was to enhance clarity, ensure specificity and coherence, and elevate overall rigor. These efforts are aimed at equipping students with a firm foundation of computer science concepts and skills for everyday life, while providing opportunities to deepen understanding to support post-secondary pursuits.

The following list summarizes the actions involved in the review and revision process.

- Received written public comments and input from stakeholders, including parents, educators, non-profit organizations, and industry on the 2017 Computer Science *Standards of Learning*.
- Convened 30 educators to form the review and revision commitment to analyze public feedback, national frameworks, and state standards to propose revisions to the 2017 Computer Science *Standards of Learning.*
- Received guidance and oversight from the Computer Science Education Advisory Board (CSEAB), diverse group of stakeholders consisting of parents, educators, institutions of higher education, non-profits, and industry.
- Facilitation of ongoing revision sessions with the CSEAB and educator committees to garner feedback and recommendations to ensure standards addressed stakeholder feedback and best practices to ensure high-quality, best-in-class standards.
- VDOE staff revised the draft of the proposed standards based on feedback received during stakeholder sessions and CSEAB Meetings.
- Convened CSEAB to review the proposed standards. Additional revisions were made to finalize the Proposed DRAFT 2024 Computer Science *Standards of Learning* (Attachment 2).

Stakeholder Engagement

Tailored communication was crafted to engage stakeholders. Information was disseminated through Superintendent Memos, newsletters, direct emails, and published on the Virginia Department of Education website.

Engagement Opportunity	Purpose	Dates Held

Public Comment Form	Solicit feedback from the public on the 2017 Computer Science *Standards of Learning* using an electronic process.	▪ March 28, 2023 – June 1, 2023
Computer Science Supervisors Regional Meeting	Solicit external feedback for CS Supervisors on the 2017 Computer Science *Standards of Learning.*	▪ Region 1 – April 19, 2023 ▪ Region 5 – April 17, 2023 ▪ Region 7 – April 13, 2023 ▪ Region 8 – April 18, 2023
Roundtable Sessions	Solicit feedback from the public on the 2017 Computer Science *Standards of Learning* using in-person or virtual sessions.	▪ May 8, 2023 – Virginia Beach ▪ May 10, 2023 – Bedford ▪ May 17, 2023 – Fairfax ▪ May 18, 2023 – Goochland ▪ May 22, 2023 – virtual (midday) ▪ May 25, 2023 – virtual (evening)
Educator Engagement Sessions	Solicit external feedback from K-12 educators, including CS Supervisors on proposed DRAFT standards	▪ October 30, 2023 ▪ October 25, 2023 ▪ November 8, 2023 ▪ January 16, 2024
Computer Science Education Advisory Board	Consist of representatives from diverse stakeholder groups: parents and students, non-profit organizations, educators, higher education, and industry to provide oversight and guidance throughout the review and revision process.	▪ June 12, 2023 (1 meeting) ▪ September 7, 2023 (2 meetings) ▪ October 5, 2023 (2 meetings) ▪ October 18, 2023 (optional meeting) ▪ November 30, 2023 (1 meeting) ▪ March 6, 2024 (1 meeting)

Overview of feedback received on the 2017 Computer Science *Standards of Learning*

Sources of Feedback	Number of Responses
Public Comment Form (electronic)	Completed responses – 5 Incomplete responses (no direct comments provided) – 8
Computer Science Supervisors Regional Meeting	Region 1 – 6 comments Region 5 – 12 comments Region 7 – 6 comments Region 8 – 6 comments
Roundtable Sessions	Bedford County – 23 comments Fairfax – 36 comments Goochland – 32 comments Virginia Beach – 28 comments Virtual (mid-day) – 41 comments Virtual (evening) – 27 comments
Computer Science Education Advisory Board	June 12, 2023 (virtual) – 44 comments

Public Comment Form provided the following recommendations:
- ▪ Enhance vertical alignment with increased opportunities for scaffolding growth

- Addition of Pre-Kindergarten computer science standards
- Integration of cloud computing, machine learning, and artificial intelligence
- Reevaluation of the depth and need for standards within networking and the Internet

<u>Computer Science Regional Advisory of CS Supervisors provided the following recommendations:</u>
- Provision of supplementary resources for teacher preparation and support
- Allocation of additional resources to address diverse learning needs
- Development of curriculum alignment resources and exemplar lessons for effective classroom instruction

<u>Roundtable sessions provided the following recommendations:</u>
Recommendations were categorized into three categories
- Comments related to "what is working" – 51 comments
- Comments related to "changes/recommendations" – 42 comments
- Comments related to "resources/support" – 83 comments

Common themes within the three categories

Working	Changes/Recommendations	Resources/Support
- Standards are comprehensive and address computer science concepts and skills through the use of the six content strands - Standards are grade-appropriate and provide a progression of learning - Standards provide students with foundational knowledge - Ease of use in the K-5 classroom	- Separate process standards from content standards - Elevate computational thinking and include emerging technologies: artificial intelligence and machine learning - Improve vertical alignment and strengthen the connection between the data & analysis content strand and data science - Address post-secondary preparedness: college and careers - Address data bias and ethics in a comprehensive and impactful way.	- Provide cross-curricular alignment resources to support K-8 implementation - Provide financial support for full implementation - Provide teacher preparation and central office staffing support - Provide recommendations for best practices and instructional textbooks and software

<u>Computer Science Education Advisory Board (CSEAB) provided the following recommendations:</u>
- Clear distinction and clarity between computer science and digital integration.
- Enhance integration and application of computational thinking and the iterative design process.

- Emphasis on real-world applications, computer science concepts, and preparing students for post-secondary goals.
- Address issues of data bias, digital citizenship, and ethics.
- Inclusion of artificial intelligence and deeper coverage of data analysis.
- Learning opportunities to apply critical thinking, creativity, collaboration, and communication skills.

Implementation and Communication

Following the Board of Education's acceptance of the Draft 2024 Computer Sciences *Standards of Learning* for first review, the Department of Education will receive public comment for at least 30 days before bringing the Draft 2024 Computer Science *Standards of Learning* to the Board of Education for final review in June 2024.

During the public comment period, the Board of Education will host public hearings, both in-person and virtually, on the Draft 2024 Computer Sciences *Standards of Learning*. Dates and times of public hearings are posted on the VDOE website and will be shared via direct channels such as newsletters and Teacher Direct.

It is anticipated that the review and revision process will be completed in June 2024 and the document will be posted via the VDOE website.

Impact on Fiscal and Human Resources

The collection and analysis of public comment and additional revisions to the Computer Science *Standards of Learning* can be absorbed by the agency's existing resources at this time. If the agency is required to absorb additional responsibilities related to this activity, other services may be impacted.