# Agenda Item: A

## Date: August 31, 2023

## Title: Final Review of the Proposed Revised 2023 Mathematics *Standards of Learning*

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## Purpose of Presentation

## Action required by state or federal regulation.

## Executive Summary

The Board of Education’s (“Board”) proposed revised 2023 Mathematics *Standards of Learning* (“revised SOL”) describe the Commonwealth’s expectations for student learning and achievement in grades K-12 mathematics. Periodic revisions of the standards are necessary to update content, clarify important concepts, and reflect current academic research and best practice in mathematics education.

In June 2023, the Board received the revised SOL for first review. From June 15, 2023, to August 11, 2023, the Board accepted written public comment and held [public hearings across the Commonwealth](https://www.doe.virginia.gov/teaching-learning-assessment/k-12-standards-instruction/mathematics/standards-of-learning/revision-of-the-2016-mathematics-sol). VDOE staff also received feedback from several national experts. The final version reflects edits made by VDOE staff based on feedback and public comments. The revised SOL represents six elementary grade levels (K-5), three middle school grade levels (6-8), and ten high school courses, including Algebra 1, Geometry, and Algebra 2.

The revised SOL are not intended to encompass the entire curriculum for a given grade level or course. School divisions are encouraged to incorporate the standards into a broader, locally designed curriculum. Even still, the revised SOL are based on a set of guiding principles that should drive the development of local division curriculum. Division level mathematics programs in grades K-12 that are built upon these principles will prepare students to pursue higher education, to compete in a modern workforce, and to be informed citizens. The principles are as follows:

1. **Raise the Floor; Remove the Ceiling:** Algebra is the gateway to higher education and promising careers. Therefore, every student in Virginia must continue their mathematics studies beyond Algebra before they graduate. We must also ensure there are no limits to how far or fast students can go in their mathematical studies. School divisions must clarify the pathways for the study of mathematics beyond Algebra and ensure that families are part of the decision-making process around which pathways best meet student needs and goals. The study of mathematics in Virginia will not be a “one size fits all” system. Due to the growing number of options for accessing advanced courses through dual and concurrent enrollment opportunities, Advanced Placement, Cambridge, and International Baccalaureate, there should be no limit to how far a student can progress in their mathematics journey by the time they leave high school.
2. **Ensure Every Student Builds Strong Mathematics Foundational Skills:** Students must possess strong foundational skills while also being able to apply these to real-world situations. Foundational skills, such as addition, subtraction, multiplication, division, fractions, and percentages are essential building blocks for upper-level mathematics.
3. **Master Critical Content:** No student should move on to a new concept nor a new course without mastery of the prerequisite material and skills. Schools need to build processes that allow student mastery to drive how time is used rather than schedules dictating student coursework. This means rethinking the development of personalized mathematics pathways which ensure students are in courses that are challenging to them, yet manageable, as well as encouraging students who have mastered prerequisite material to enroll in more advanced courses and content beyond their grade level.
4. **Integrate Mathematics Across All Content Areas:** Mathematics appears in all content areas including a balanced equation in Chemistry, a measure in music, or a historic timeline in social studies. The application of mathematics in other content areas provides an opportunity for students to think critically and problem solve as students navigate complex data sets, design principles, and use technology in and across other content areas. Students will have the opportunity to learn mathematics in all content areas and be more informed citizens who see the connections between mathematics and the world around them.
5. **Prepare Teachers to Teach Mathematics Accurately and Effectively:** To have great mathematics students, we must have great mathematics teachers. Our educators will receive training that helps them convey content accurately and effectively to their students. By training teachers well, our students will master the basics of mathematics, deepen their mathematical knowledge and be able to apply mathematics across content areas and to real world situations. Teachers must have strong instructional materials, be trained in how to use these materials, and be able to support struggling students as well as provide advanced opportunities to those students who learn mathematics more quickly.
6. **Apply Mathematics to Better Use Technology:** Students will learn foundational mathematical skills and master computational skills before using technology as a substitute. As students’ progress in their mathematical knowledge, they will apply mathematics in a variety of experiential contexts to learn and use technology appropriately. Students will learn how technology is a tool that facilitates complex mathematical thinking, requires students to solve complex problems and allows students to simulate real-world scenarios that integrates the application of mathematical reasoning and critical thinking.

The revised SOL represent best-in-class mathematics for all students in the Commonwealth and are among the most challenging in the nation when benchmarked against NAEP, ACT, and SAT. They will raise academic expectations for students and schools and provide a coherent and vertically articulated set of standards to educators and families. Instruction based on these high-quality standards will ensure that all students are prepared to apply mathematical concepts in their career and college pathways.

This item supports Priority 3 of the Board’s Comprehensive Plan by ensuring rigorous standards to promote college, career, and civic readiness.

## Action Requested

Final review: Action requested at this meeting.

## Superintendent’s Recommendation

The Superintendent of Public Instruction recommends that the Board of Education approve the revised SOLto be fully implemented in 2024-2025 and authorize VDOE to make clarifying and/or technical edits.

**Rationale for Action**

Section [22.1-253.13:1](https://law.lis.virginia.gov/vacode/title22.1/chapter13.2/section22.1-253.13%3A1/#v1/)(B) of the Code of Virginia requires that the SOL be revised every seven years. The first Mathematics *Standards of Learning* were developed in 1995, with subsequent revisions in 2001, 2009, and 2016. In 2011, supplemental content was added to the Mathematics *Standards of Learning Curriculum Framework* in orderto align with Common Core Mathematics Standards. The [2016 Mathematics *Standards of Learning*](https://www.doe.virginia.gov/teaching-learning-assessment/instruction/mathematics/standards-of-learning-for-mathematics) were adopted by the Board of Education in October 2016 and are thus due for revision under state law.

## Previous Review or Action

**Date:** January 27, 2022

**Action:** Report on the [Timeline for the Mathematics *Standards of Learning* Review and Revision Process](https://www.doe.virginia.gov/home/showpublisheddocument/35480/638054960399770000).

**Date:** June 15, 2023

**Action:** Board accepted the [Proposed Revised 2023 Mathematics *Standards of Learning*](https://www.doe.virginia.gov/home/showpublisheddocument/45377/638218327076830000) for First Review

## Background Information and Statutory Authority

Section [22.1-253.13:1](https://law.lis.virginia.gov/vacode/title22.1/chapter13.2/section22.1-253.13%3A1/#v1/) of the *Code of Virginia* requires the Board to establish educational objectives that form the core of Virginia’s educational program and that the Standards be reviewed every seven years. It states, in part:

1. The General Assembly and the Board of Education believe that the fundamental goal of the public schools of the Commonwealth must be to enable each student to develop the skills that are necessary for success in school, preparation for life, and reaching their full potential. The General Assembly and the Board of Education find that the quality of education is dependent upon the provision of (i) the appropriate working environment, benefits, and salaries necessary to ensure the availability of high-quality instructional personnel; (ii) the appropriate learning environment designed to promote student achievement; (iii) quality instruction that enables each student to become a productive and educated citizen of Virginia and the United States of America; and (iv) the adequate commitment of other resources. In keeping with this goal, the General Assembly shall provide for the support of public education as set forth in Article VIII, Section 1 of the Constitution of Virginia.
2. The Board of Education shall establish educational objectives known as the Standards of Learning, which shall form the core of Virginia's educational program, and other educational objectives, which together are designed to ensure the development of the skills that are necessary for success in school and for preparation for life in the years beyond. At a minimum, the Board shall establish Standards of Learning for English, mathematics, science, and history and social science. The Standards of Learning shall not be construed to be regulations as defined in § [2.2-4001](https://law.lis.virginia.gov/vacode/2.2-4001/).

The Board shall seek to ensure that the Standards of Learning are consistent with a high-quality foundation educational program. The Standards of Learning shall include, but not be limited to, the basic skills of communication (listening, speaking, reading, and writing); computation and critical reasoning, including problem solving and decision making; proficiency in the use of computers and related technology; computer science and computational thinking, including computer coding; and the skills to manage personal finances and to make sound financial decisions.

The Standards of Learning in all subject areas shall be subject to regular review and revision to maintain rigor and to reflect a balance between content knowledge and the application of knowledge in preparation for eventual employment and lifelong learning. 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.

To provide appropriate opportunity for input from the general public, teachers, and local school boards, the Board of Education shall conduct public hearings prior to establishing revised Standards of Learning. Thirty days prior to conducting such hearings, the Board shall give notice of the date, time, and place of the hearings to all local school boards and any other persons requesting to be notified of the hearings and publish notice of its intention to revise the Standards of Learning in the Virginia Register of Regulations. Interested parties shall be given reasonable opportunity to be heard and present information prior to final adoption of any revisions of the Standards of Learning.

**Public Comment**

In-person [public hearings](https://www.doe.virginia.gov/teaching-learning-assessment/k-12-standards-instruction/mathematics/standards-of-learning/revision-of-the-2016-mathematics-sol) were held in Fredericksburg, Hampton, Winchester, and Abingdon between July 27 and August 10, 2023. In addition, six virtual public hearings were held between July 10 and August 7, 2023. There were 19 attendees in total at the four in-person public hearings with 11 of the attendees providing comment. There were 69 attendees in total at the six virtual public hearings with 7 of the attendees providing comment.

Public comments were also collected through an electronic form submission and via email at vdoe.mathematics@doe.virginia.gov. A total of 172 individual submissions of public comment were received during the written public comment period from June 15, 2023, through August 11, 2023. Individuals using the electronic form could submit up to three specific comments, either general comments or more specific to a grade level or course.

The following provides information regarding the written public comments received and the public hearings that were held regarding the draft 2023 Mathematic*s Standards of Learning*:

| **Sources of Public Comment** | **Dates** | **Number of Responses/Stakeholders** |
| --- | --- | --- |
| 1. **Written Public Comment** **(electronic form)**
 | **June 15, 2023 -August 11, 2023** | * 159 submissions
* 73 General comments
* 243 Additional grade/course level comments
 |
| 1. **Written Public Comment (email)**
 | **June 15, 2023 -August 11, 2023** | * 13 emails received
 |
| 1. **In Person Public Hearing Sessions**
 | **July/August 2023** | * Fredericksburg (7/27/23) 2 speakers (3 attendees total)
* Hampton (7/31/23) 3 speakers (9 attendees total)
* Winchester (8/8/23) 5 speakers (6 attendees total)
* Abingdon (8/10/23) 1 speaker (1attendee total)
 |
| 1. **Virtual Public Hearing Sessions**
 | **July/August 2023** | * 7/10/23 - 9:00 a.m.

1 speaker (17 attendees total)* 7/10/23 - 6:30 p.m.

0 speakers (10 attendees total)* 7/25/23 - 6:30 p.m.

2 speakers (12 attendees total)* 8/2/23 - 12:00 p.m.

2 speakers (14 attendees total)* 8/2/23 - 6:30 p.m.

1 speaker (5 attendees total)* 8/7/23 - 6:30 p.m.

1 speaker (11 attendees total) |

The following chart provides information regarding the number of responses received for each grade or course by individuals using the electronic form when submitting written public comment:

| **Grade/Course** | **Number of Responses** | **Grade/Course** | **Number of Responses** |
| --- | --- | --- | --- |
| Kindergarten | 4 | Algebra 1 | 55 |
| Grade 1 | 3 | Geometry | 41 |
| Grade 2 | 7 | Algebra 2 | 16 |
| Grade 3 | 22 | Trigonometry | 2 |
| Grade 4 | 14 | AFDA | 5 |
| Grade 5 | 12 | Mathematical Analysis | 1 |
| Grade 6 | 13 | Discrete Mathematics | 1 |
| Grade 7 | 31 |  |  |
| Grade 8 | 16 | General | 73 |

A breakdown of the primary stakeholder groups providing written comment through the online electronic form is shown:

|  |  |
| --- | --- |
| **PRIMARY****Stakeholder Group** | **Percent** |
| K-12 Educator | 79.2% |
| Parent/Guardian | 14.4% |
| Other | 3.1% |
| Workforce/Business Representative | 2.5% |
| K-12 Student | 0.6% |
| Faculty – College or University | 0% |

Additional stakeholder groups provided feedback including state mathematics organizations, national mathematics experts, and parent organizations.

The VDOE reconvened the Mathematics Education Advisory Committee (MEAC) in August 2023. The MEAC is a group composed of parents, community members, business and workplace leaders, faculty from institutions of higher education, and K-12 educators. The committee analyzed public comment, reviewed the edits to the Draft 2023 Mathematics *Standards of Learning*, and provided recommendations. VDOE staff considered all recommendations made by the MEAC, the following of which have been specifically addressed in the revised SOL:

1. Data Analysis and Data Science - The MEAC recommends that the data science standards be concretely linked to existing content standards. In particular, synthesizing data science standards within other standards of the course would more directly link to the other topics.
2. Algebra 1 in Middle School - The MEAC recommends that VDOE develop guidelines for standards to compress for Grade 7 and Grade 8 to provide opportunities for acceleration. K-8 standards remain distributed across those school years.
3. Technology/Calculators - The MEAC recommends incorporating additional technology and continuing the use of calculators (such as Desmos) in order to enhance understanding and encourage calculator utilization as a valuable skill.
4. Conceptual Understanding and Procedural Fluency - The MEAC recommends that the Mathematics Standards of Learning include a blend of both conceptual understanding and procedural fluency.
5. Mathematics Process Goals - The MEAC recommends that process goals be embedded throughout the curriculum framework in the knowledge and skills (right hand side), where they belong with the mathematics.

The final versions of the revised SOL have been edited after consideration of the feedback provided in public comment.

## Implementation and Communications

Following the Board’s approval of the revised SOL, VDOE staff will post a final version of 2023 Mathematics *Standards of Learning* on the VDOE website. VDOE proposes the following implementation timeline and communication plan:

| **School Year** | **Date** | **Action** | **Communication** | **Method** |
| --- | --- | --- | --- | --- |
| **2023-2024**  | August 2023 | Board of Education approves the 2023 Mathematics *Standards of Learning* (SOL)  | Announce approval of the SOL, implementation timeline, and expectations for incorporating the new standards into local curricula  | Superintendent’s Newsletter, VDOE social media, Teacher Direct, GovDelivery, and other communication channels |
|  | September 2023 | Final versions of the 2023 Mathematics SOL posted | Announce posting of final versions and expectations for incorporating the new standards into local curricula | Superintendent’s Newsletter, VDOE social media, Teacher Direct, GovDelivery, and other communication channels |
|  | September/October 2023 | VDOE provides transition support in the implementation of the Mathematics SOL  | Announce posting of resources to support the 2023-2024 transition year  | Superintendent’s Newsletter, VDOE social media, Teacher Direct, GovDelivery, and other communication channels |
|  | Fall 2023Spring/Summer 2024 | VDOE convenes teams of teachers and specialists to support revision and development of instructional resources aligned to the 2023 Mathematics Standards of Learning |  |  |
|  | Spring/ Summer2024 | VDOE provides professional learning and curriculum development support on the changes to the Mathematics SOL  | Announce professional learning, and direct and indirect regional support options | Superintendent’s Newsletter, VDOE social media, Teacher Direct, GovDelivery, and other communication channels |
|  | Spring 2024 | SOL assessments measure the 2016 Mathematics SOLand include field test items measuring the 2023 Mathematics SOL |  |  |
|  | Summer 2024 | VDOE provides Dynamic Instructional Guides (DIGs) aligned with the 2023 Mathematics Standards of LearningSchool divisions incorporate 2023 Mathematics SOL into local curricula | Announce posting of resource | Superintendent’s Newsletter, VDOE social media, Teacher Direct, GovDelivery, and other communication channels |
| **2024-2025**5Crosswalk Year | 2024-2025 | Instruction aligned fully to 2023 Mathematics Standards of LearningVDOE continues to revise/develop resources aligned to the 2023 Mathematics Standards of Learning and provide professional learning opportunities to school divisions |  |  |
|  | Spring 2025 | SOL assessments measure the 2023Mathematics SOL |  |  |

## Impact on Fiscal and Human Resources:

The revisions 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. Additional resources are being considered in order to support implementation.