

# Virginia

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Standards of Learning Assessments

Test Blueprint  
**Grade 4 Mathematics**  
2023 Mathematics  
Standards of Learning

**This test blueprint will be effective with the administration of the spring 2025 Mathematics Standards of Learning (SOL) tests.**

# Grade 4 Mathematics Standards of Learning

## Test Blueprint

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## General Test Information

### Test Blueprint

Much like the blueprint for a building, a test blueprint serves as a guide for test construction. The blueprint indicates the content standards that will be addressed by the test and the number of items that will be included by reporting category and for the test as a whole. There is a blueprint for each test (e.g., Grade 3 Reading, Grade 5 Mathematics, Grade 8 Science, Virginia and United States History).

The Grade 4 Mathematics test blueprint contains information for two types of tests, the online computer adaptive test (CAT) and the traditional/paper format test. A CAT is an online assessment that is customized for every student based on how the student responds to the questions. This is in contrast to the traditional/paper format test in which all students who take a particular version (paper, large print, or braille) of the test respond to the same test questions. All online versions of the Grade 4 Mathematics Standards of Learning (SOL) test (including audio) are computer adaptive.

All students are required to take the online version of the SOL tests except for students who meet the criteria for needing a paper test. All paper versions of the test (including large print and braille) will be administered using the traditional/paper format. All test questions for Grade 4 Mathematics have been determined to meet the criteria for Universal Design. The Universal Design principles require that language that is not specific to the content area (e.g., mathematics) be simplified and test questions be written so they are accessible by all populations of students. The SOL test questions have been reviewed by Virginia teachers and have been determined to meet the criteria for Universal Design.

### Reporting Categories

Each test covers a number of standards. In the test blueprint, the SOL are grouped into reporting categories that address related content and skills. For example, a reporting category for the Grade 4 Mathematics SOL test is *Computation and Estimation*. Each of the SOL in this reporting category addresses computation using addition, subtraction, multiplication, or division or requires the student to estimate the answer to a problem. When the results of the SOL tests are reported, the scores will be presented for each reporting category and as a test scaled score.

### Assignment of Standards of Learning to Reporting Category

In the Grade 4 Mathematics SOL test, each standard is assigned to only one reporting category as described by the Grade 4 Mathematics SOL. For example, SOL 4.NS.3 is assigned to *Number and Number Sense*.

### Coverage of Standards of Learning

Due to the large number of SOL in each grade level content area, every standard will not be assessed on every SOL test. By necessity, to keep the length of a test reasonable, each test will sample from the SOL within a reporting category. All SOL are eligible for inclusion on the traditional/paper forms as well as the CAT forms.

## [Use of 2023 Mathematics Standards of Learning Resource Documents](#)

The Grade 4 Mathematics SOL, amplified by the Understanding the Standards and Instructional Guides, define the essential understandings, knowledge, and skills that are measured by the SOL tests. These resource documents include the mathematics understandings and key concepts that assist teachers in planning standards-focused instruction of the 2023 Mathematics SOL.

### **Use of Calculators**

Grade 4 SOL calculator-active items will have the online Desmos Virginia Four Function calculator included with the item on the toolbar in the online computer adaptive test. For additional information, please refer to the list of [Online Mathematics Tools](#) available on the Grades 3-8 Mathematics tests.

### **Additional Items**

Per legislation passed in the 2021 Virginia General Assembly ( [HB2027](#) and [SB1357](#)), the computer adaptive SOL tests include a section of additional items at the end of the test. The computer algorithm may deliver items one grade level above or one grade level below a student's current grade based upon the student's responses to the on-grade-level items. The Test Scaled Score (0 to 600) and corresponding performance level (i.e., pass/proficient, pass/advanced, fail/basic, fail/below basic) are based upon a student's performance on the on-grade-level Operational Items only. The student's responses to the on-grade-level Operational Items *and* the Additional Items that may be on grade level, one grade level above, or one grade level below the current grade level will be reflected in the student's Vertical Scaled Score.

### **Seal Code**

A seal code will appear approximately halfway through the computer adaptive test. The exact placement of the seal code may vary by 2-3 items on the computer adaptive test. The seal code in the online CAT does not separate the no-calculator-active test questions from the calculator-active test questions; as such, no-calculator-active test questions may appear before and/or after the seal code. On the traditional/paper test forms, a stop sign will appear to separate the no-calculator-active test questions from the calculator-active test questions.

### **Assessment Resources**

[Standards of Learning Introduction to TestNav 8: Multiple-Choice/Technology-Enhanced Item Tests](#): This document is an introduction to the online navigation, online tools, accessibility features, and overall functionality and appearance of multiple-choice/technology-enhanced item tests in TestNav 8. It is highly recommended that teachers or other adults read this document prior to reading the Guided Practice Suggestions for a practice item set. This document also provides an overview of the various technology-enhanced items students may receive in the online test.

[SOL Practice Items](#): Practice item sets are available for each grade to provide online practice with content that measures the 2023 Mathematics SOL.

Guided Practice Suggestions: Mathematics Items Practice: This document, available on the [SOL Practice Items web page](#), provides specific suggestions for teachers as they lead students through a practice item set. Following these suggestions will ensure that students are exposed to the different tools within TestNav, the

different functionality features of technology-enhanced items (TEI), and common messages that may appear as students complete TEI.

Mathematics Tools Practice: This document, available on the [SOL Practice Items web page](#), provides practice suggestions for each question in the Mathematics Tools practice item set. The “Guided Practice Suggestions” contains information for teachers to use at various grade levels as they guide students through the items. For instance, guided practice suggestions can state, “Use the ruler tool to measure line segment AB” or “Use the protractor to measure an angle.” Following the suggestions in the table will ensure that students are exposed to all of the different tools within TestNav 8 and experience using these tools with their mouse, keypad, or touchscreen.

Mathematics formula sheets may be found on the [Ancillary Test Materials](#) web page.

**Grade 4 Mathematics Test Blueprint Summary Table**

Reporting Category	<a href="#">Grade 4 SOL</a>	Number of Items Computer Adaptive Test (CAT) Format	Number of Items Traditional (Paper) Format
<b>Number and Number Sense*</b>	4.NS.1 4.NS.2 4.NS.3 4.NS.4 4.NS.5	9-11 items 25-31% of test	11 items About 28% of test
		<i>4-5 Number and Number Sense items (11-14% of the overall test) will be assessed without the use of a calculator.*</i>	<i>5-6 items Number and Number Sense items (13-15% of the overall test) will be assessed without the use of a calculator.*</i>
<b>Computation and Estimation*</b>	4.CE.1 4.CE.2 4.CE.3 4.CE.4	10-12 items 28-33% of test	12 items About 30% of test
		<i>5-6 Computation and Estimation items (14-17% of the overall test) will be assessed without the use of a calculator.*</i>	<i>6-7 Computation and Estimation items (15-18% of the overall test) will be assessed without the use of a calculator.*</i>
<b>Measurement and Geometry</b>	4.MG.1 4.MG.2 4.MG.3 4.MG.4 4.MG.5 4.MG.6	7-9 items 19-25% of test	9 items About 22% of test
<b>Probability, Statistics, Patterns, Functions, and Algebra</b>	4.PS.1 4.PS.2 4.PFA.1	6-8 items 17-22% of test	8 items About 20% of test
<b>Number of Operational Items</b>		36	40
<b>Number of Field-Test Items**</b>		5	5
<b>Number of Additional On- or Off-Grade-Level Items***</b>		6	0
The online CAT includes multiple-choice questions and technology-enhanced items (TEI). The number of TEI on the CAT can range from 10% to 30% as the test meets the blueprint requirements and adapts to the performance level of the individual student.			

A seal code will appear approximately halfway through the operational and field-test items on a computer adaptive test. The exact placement of the seal code may vary by 2-3 items on the computer adaptive test. On a paper test, a stop sign will separate the no-calculator-active test questions from the calculator-active test questions.

\*Items measuring some SOL in this reporting category will be completed without the use of a calculator. Calculator-active items will have the online calculator included with the item. For additional information, please refer to the [Grade 4 Mathematics Standards of Learning](#).

\*\*Field-test items will be administered to students for potential use on subsequent tests and will not be used to compute the final test score.

\*\*\* Legislation passed in the 2021 Virginia General Assembly ([HB2027](#) and [SB1357](#)) requires these assessments have the ability to contain additional test items at, below, and above a student’s grade level as appropriate for the student. All test items will be delivered online via the computer adaptive algorithm. Students who meet the criteria for a paper test will receive only on-grade-level items.