

# Test Blueprint **Grade 5 Mathematics** 2016 Mathematics Standards of Learning

**This test blueprint will be effective with the administration of the spring 2024 Mathematics Standards of Learning (SOL) tests.**

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**Grade 5 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 areas that will be addressed by the test and the number of items that will be included by content area 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 5 Mathematics blueprint contains information for two types of tests, the online computer adaptive test (CAT) and the traditional 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 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 5 Mathematics Standards of Learning (SOL) test (including audio) are computer adaptive.

All students are required to take the online version of the SOL tests with the exception of 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 format. All test questions for Grade 5 Mathematics have been determined to meet the criteria for Universal Design. The Universal Design principles require 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 of Learning. In the test blueprint, the SOL are grouped into categories that address related content and skills. These categories are labeled as reporting categories*.* For example, a reporting category for the Grade 5 Mathematics Standards of Learning 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 total test score.

### Assignment of Standards of Learning to Reporting Category

In the Grade 5 Mathematics SOL test, each SOL is assigned to only one reporting category. For example, SOL 5.2a-b 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 of Learning 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 forms as well as the CAT forms.

### Use of the Curriculum Framework

The Grade 5 Mathematics Standards of Learning, amplified by the Curriculum Framework, define the essential understandings, knowledge, and skills that are measured by the Standards of Learning tests. The Curriculum Framework asks essential questions, identifies essential understandings, defines essential content knowledge, and describes essential skills students need to master.

### Use of Calculators

Grade 5 SOL calculator-active items will have the online calculator included with the item on the toolbar. For additional information, please refer to the list of Online Mathematics Tools available on the Grades 3-8 Mathematics Growth Assessments.

### Additional Items

Beginning in spring 2023, the computer adaptive Standards of Learning tests will 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 item**s**. 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. A stop sign will appear after question 12 on the paper test and separates the no-calculator-active test questions from the calculator-active test questions.

## Grade 5 Mathematics Test Blueprint Summary Table

Beginning in spring 2023, the computer adaptive Standards of Learning tests will include an additional section of 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 item**s**. The Overall Scaled Score (0 to 600) and corresponding performance level (i.e., pass/proficient, pass/advanced, fail/basic, fail/below basic) is 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.

|  |  |  |  |
| --- | --- | --- | --- |
| **Reporting Category** | **Grade 5 SOL** | **Number of Items**  **Computer Adaptive Test (CAT) Format** | **Number of Items**  **Paper Format** |
| **Number and Number Sense** | **5.1**  **5.2a\*, b\***  **5.3a-b** | **5** | **7** |
| **Computation and Estimation** | **5.4**  **5.5a\*, b**  **5.6a, b\***  **5.7\*** | **9** | **13** |
| **Measurement and Geometry** | **5.8a-b**  **5.9a-b**  **5.10**  **5.11**  **5.12**  **5.13a-b**  **5.14a-b** | **9** | **13** |
| **Probability, Statistics, Patterns, Functions, and Algebra** | **5.15**  **5.16a-c**  **5.17a-d**  **5.18**  **5.19a-d** | **12** | **17** |
| **Number of Operational Items** | | **35** | **50** |
| **Number of Field-Test Items\*\*** | | **5** | **0** |
| **Number of Additional On- or Off-Grade-Level Items\*\*\*** | | **6** | **0** |

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. A stop sign will separate the no-calculator-active test questions from the calculator-active test questions on a paper test.

\*Items measuring these SOL 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 list of Online Mathematics Tools available on the Grades 3-8 Mathematics Growth Assessments.

\*\*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](https://lis.virginia.gov/cgi-bin/legp604.exe?ses=212&typ=bil&val=HB2027) and [SB1357](https://lis.virginia.gov/cgi-bin/legp604.exe?ses=212&typ=bil&val=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.

## Grade 5 Mathematics Expanded Test Blueprint

### Reporting Category: Number and Number Sense

**Number of Items: 5 (CAT) 7 (Traditional)**

**Standards of Learning:**

5.1 The student, given a decimal through thousandths, will round to the nearest whole number, tenth, or hundredth.

5.2 The student will

1. represent and identify equivalencies among fractions and decimals, with and without models; and
2. compare and order fractions, mixed numbers, and/or decimals in a given set, from least to greatest and greatest to least.

5.3 The student will

* 1. identify and describe the characteristics of prime and composite numbers; and
  2. identify and describe the characteristics of even and odd numbers.

### Reporting Category: Computation and Estimation

**Number of Items: 9 (CAT) 13 (Traditional)**

**Standards of Learning:**

5.4 The student will create and solve single-step and multistep practical problems involving addition, subtraction, multiplication, and division of whole numbers.

5.5 The student will

1. estimate and determine the product and quotient of two numbers involving decimals; and
2. create and solve single-step and multistep practical problems involving addition, subtraction, and multiplication of decimals, and create and solve single-step practical problems involving division of decimals.

5.6 The student will

1. solve single-step and multistep practical problems involving addition and subtraction with fractions and mixed numbers; and
2. solve single-step practical problems involving multiplication of a whole number, limited to 12 or less, and a proper fraction, with models.

5.7 The student will simplify whole number numerical expressions using the order of operations.

### Reporting Category: Measurement and Geometry

**Number of Items: 9 (CAT) 13 (Traditional)**

**Standards of Learning:**

5.8 The student will

1. solve practical problems that involve perimeter, area, and volume in standard units of measure; and
2. differentiate among perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.

5.9 The student will

1. given the equivalent measure of one unit, identify equivalent measurements within the metric system; and
2. solve practical problems involving length, mass, and liquid volume using metric units.

5.10 The student will identify and describe the diameter, radius, chord, and circumference of a circle.

5.11 The student will solve practical problems related to elapsed time in hours and minutes within a 24-hour period.

5. 12 The student will classify and measure right, acute, obtuse, and straight angles.

5.13 The student will

* 1. classify triangles as right, acute, or obtuse and equilateral, scalene, or isosceles; and
  2. investigate the sum of the interior angles in a triangle and determine an unknown angle measure.

5.14 The student will

1. recognize and apply transformations, such as translation, reflection, and rotation; and
2. investigate and describe the results of combining and subdividing polygons.

### Reporting Category: Probability, Statistics, Patterns, Functions, and Algebra

**Number of Items: 12 (CAT) 17 (Traditional)**

**Standards of Learning:**

5.15 The student will determine the probability of an outcome by constructing a sample space or using the Fundamental (Basic) Counting Principle.

5. 16 The student, given a practical problem, will

1. represent data in line plots and stem-and-leaf plots;
2. interpret data represented in line plots and stem-and-leaf plots; and
3. compare data represented in a line plot with the same data represented in a stem-and-leaf plot.

5.17 The student, given a practical context, will

1. describe mean, median, and mode as measures of center;
2. describe mean as fair share;
3. describe the range of a set of data as a measure of spread; and
4. determine the mean, median, mode, and range of a set of data.

5.18 The student will identify, describe, create, express, and extend number patterns found in objects, pictures, numbers and tables.

5.19 The student will

* 1. investigate and describe the concept of variable;
  2. write an equation to represent a given mathematical relationship, using a variable;
  3. use an expression with a variable to represent a given verbal expression involving one operation; and
  4. create a problem situation based on a given equation, using a single variable and one operation.