Virginia

Standards of Learning Assessments

Test Blueprint

Grade 4 Mathematics

2009 Mathematics Standards of Learning

This revised test blueprint will be effective beginning with the spring 2017 test administration.

Notice to Reader

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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 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 4 Mathematics blueprint contains information for two types of tests, the online computer adaptive test (CAT) and the traditional test. A CAT is a customized assessment for each 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 of the test respond to the same test questions.

All online versions of the Grade 4 Mathematics test (including Plain English, Plain English audio, and regular audio) will be computer adaptive beginning in spring 2017. All paper versions of the test (including Plain English, large print, and Braille) will be administered using the traditional format.

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 4 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 4 Mathematics SOL test, each SOL is assigned to only one reporting category. For example, SOL 4.1a-c is assigned to "Number and Number Sense."

Standards of Learning Excluded from Testing
In some content areas, there are SOL that do not lend themselves to assessment within the current format of the SOL tests. The SOL not tested are listed as *Excluded from Testing* at the end of the blueprint for each test.

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.

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Use of the Curriculum Framework

The Grade 4 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

The first section of the test will be taken without the use of a calculator. The SOL 4.4 a-d and 4.5 a-d will be assessed in the first section of the Grade 4 Mathematics test. All other SOL will be assessed in the second section with the use of a calculator.

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Grade 4 Mathematics
Test Blueprint Summary Table

Reporting Category	Grade 4 SOL	Number of Items Computer Adaptive Test (CAT) Format	Number of Items Traditional Format
Number and Number Sense	**4.1a-c 4.2a-c 4.3a-d**	**9**	**12**
Computation and Estimation	**4.4a-d* 4.5a-d***	**9**	**13**
Measurement and Geometry	**4.6a-b 4.7a-b 4.8a-b 4.9 4.10a-b 4.11a-b 4.12a-b**	**9**	**13**
Probability, Statistics, Patterns, Functions, and Algebra	**4.13a-b 4.14 4.15 4.16a-b**	**8**	**12**
Excluded from Testing	**None**		
Number of Operational Items		**35**	**50**
Number of Field-Test Items**		**4**	**10**
Total Number of Items on Test		**39**	**60**

*Items measuring these SOL will be completed <u>without</u> the use of a calculator.

**Field-test items are being tried out with students for potential use on subsequent tests and will not be used to compute students' scores on the test.

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Grade 4 Mathematics
Expanded Test Blueprint

Reporting Category: Number and Number Sense
Number of Items: 9 (CAT)   12 (Traditional)
Standards of Learning:

4.1   The student will
   a) identify orally and in writing the place value for each digit in a whole number expressed through millions;
   b) compare two whole numbers expressed through millions, using symbols (>, <, or =); and
   c) round whole numbers expressed through millions to the nearest thousand, ten thousand, and hundred thousand.

4.2   The student will
   a) compare and order fractions and mixed numbers;
   b) represent equivalent fractions; and
   c) identify the division statement that represents a fraction.

4.3   The student will
   a) read, write, represent, and identify decimals expressed through thousandths;
   b) round decimals to the nearest whole number, tenth, and hundredth;
   c) compare and order decimals; and
   d) given a model, write the decimal and fraction equivalents.

Reporting Category: Computation and Estimation
Number of Items: 9 (CAT)   13 (Traditional)
Standards of Learning:

4.4   The student will (*complete items without the use of a calculator*)
   a) estimate sums, differences, products, and quotients of whole numbers;
   b) add, subtract, and multiply whole numbers;
   c) divide whole numbers, finding quotients with and without remainders; and
   d) solve single-step and multistep addition, subtraction, and multiplication problems with whole numbers.

4.5   The student will (*complete items without the use of a calculator*)
   a) determine common multiples and factors, including least common multiple and greatest common factor;
   b) add and subtract fractions having like and unlike denominators that are limited to 2, 3, 4, 5, 6, 8, 10, and 12, and simplify the resulting fractions, using common multiples and factors;
   c) add and subtract with decimals; and

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d) solve single-step and multistep practical problems involving addition and subtraction with fractions and with decimals.

Reporting Category: Measurement and Geometry
Number of Items: 9 (CAT)   13 (Traditional)
Standards of Learning:

4.6   The student will
   a) estimate and measure weight/mass and describe the results in U.S. Customary and metric units as appropriate; and
   b) identify equivalent measurements between units within the U.S. Customary system (ounces, pounds, and tons) and between units within the metric system (grams and kilograms).

4.7   The student will
   a) estimate and measure length, and describe the result in both metric and U.S. Customary units; and
   b) identify equivalent measurements between units within the U.S. Customary system (inches and feet; feet and yards; inches and yards; yards and miles) and between units within the metric system (millimeters and centimeters; centimeters and meters; and millimeters and meters).

4.8   The student will
   a) estimate and measure liquid volume and describe the results in U.S. Customary units; and
   b) identify equivalent measurements between units within the U.S. Customary system (cups, pints, quarts, and gallons).

4.9   The student will determine elapsed time in hours and minutes within a 12-hour period.

4.10   The student will
   a) identify and describe representations of points, lines, line segments,
rays,   and angles, including endpoints and vertices; and
   b) identify representations of lines that illustrate intersection, parallelism,
and   perpendicularity.

4.11   The student will
   a) investigate congruence of plane figures after geometric transformations, such as reflection, translation, and rotation, using mirrors, paper folding, and tracing; and
   b) recognize the images of figures resulting from geometric transformations, such as translation, reflection, and rotation.

4.12   The student will
   a) define *polygon*; and
   b) identify polygons with 10 or fewer sides.

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Reporting Category: Probability, Statistics, Patterns, Functions, and Algebra
Number of Items: 8 (CAT)   12 (Traditional)
Standards of Learning:

4.13   The student will
      a) predict the likelihood of an outcome of a simple event; and
      b) represent probability as a number between 0 and 1, inclusive.

4.14   The student will collect, organize, display, and interpret data from a variety of graphs.

4.15   The student will recognize, create, and extend numerical and geometric patterns.

4.16   The student will
      a) recognize and demonstrate the meaning of equality in an equation; and
      b) investigate and describe the associative property for addition and
         multiplication.

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