

Virginia

Standards of Learning Assessments

Test Blueprint

Grade 7 Mathematics

**2009 Mathematics
Standards of Learning**

**This revised test blueprint will be effective beginning with the
fall 2015 test administration.**

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Grade 7 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 7 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 7 Mathematics test (including Plain English, Plain English audio, and regular audio) will be computer adaptive beginning in fall 2015. 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 7 Mathematics Standards of Learning test is *Measurement and Geometry*. Each of the SOL in this reporting category requires the student to measure, describe, or compare geometric figures. 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 7 Mathematics SOL test, each SOL is assigned to only one reporting category. For example, SOL 7.1b-d is assigned to “Number, Number Sense, Computation and Estimation.”

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.

Use of the Curriculum Framework

The Grade 7 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 7.1b-d and 7.3b will be assessed in the first section of the Grade 7 Mathematics test. All other SOL will be assessed in the second section with the use of a calculator.

**Grade 7 Mathematics
Test Blueprint Summary Table**

Reporting Category	Grade 7 SOL	Number of Items Computer Adaptive Test (CAT) Format	Number of Items Traditional Format
Number, Number Sense, Computation and Estimation	7.1a 7.1b-d* 7.1e 7.2 7.3a 7.3b* 7.4	14	16
Measurement and Geometry	7.5a-c 7.6 7.7 7.8	12	13
Probability, Statistics, Patterns, Functions, and Algebra	7.9 7.10 7.11a-b 7.12 7.13a-b 7.14a-b 7.15a-b 7.16a-e	19	21
Excluded from Testing	None		
Number of Operational Items		45	50
Number of Field-Test Items**		8	10
Total Number of Items on Test		53	60

*Items measuring these SOL will be completed without 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.

Grade 7 Mathematics Expanded Test Blueprint

Reporting Category: Number, Number Sense, Computation and Estimation

Number of Items: 14 (CAT) 16 (Traditional)

Standards of Learning:

- 7.1 The student will
- a) investigate and describe the concept of negative exponents for powers of ten;
 - b) (*complete items without the use of a calculator*) determine scientific notation for numbers greater than zero;
 - c) (*complete items without the use of a calculator*) compare and order fractions, decimals, percents, and numbers written in scientific notation;
 - d) (*complete items without the use of a calculator*) determine square roots; and
 - e) identify and describe absolute value for rational numbers.
- 7.2 The student will describe and represent arithmetic and geometric sequences, using variable expressions.
- 7.3 The student will
- a) model addition, subtraction, multiplication, and division of integers; and
 - b) (*complete items without the use of a calculator*) add, subtract, multiply, and divide integers.
- 7.4 The student will solve single-step and multistep practical problems, using proportional reasoning.

Reporting Category: Measurement and Geometry

Number of Items: 12 (CAT) 13 (Traditional)

Standards of Learning:

- 7.5 The student will
- a) describe volume and surface area of cylinders;
 - b) solve practical problems involving the volume and surface area of rectangular prisms and cylinders; and
 - c) describe how changing one measured attribute of a rectangular prism affects its volume and surface area.
- 7.6 The student will determine whether plane figures—quadrilaterals and triangles—are similar and write proportions to express the relationships between corresponding sides of similar figures.
- 7.7 The student will compare and contrast the following quadrilaterals based on properties: parallelogram, rectangle, square, rhombus, and trapezoid.

- 7.8 The student, given a polygon in the coordinate plane, will represent transformations (reflections, dilations, rotations, and translations) by graphing in the coordinate plane.

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

Number of Items: 19 (CAT) 21 (Traditional)

Standards of Learning:

- 7.9 The student will investigate and describe the difference between the experimental probability and theoretical probability of an event.
- 7.10 The student will determine the probability of compound events, using the Fundamental (Basic) Counting Principle.
- 7.11 The student, given data for a practical situation, will
- construct and analyze histograms; and
 - compare and contrast histograms with other types of graphs presenting information from the same data set.
- 7.12 The student will represent relationships with tables, graphs, rules, and words.
- 7.13 The student will
- write verbal expressions as algebraic expressions and sentences as equations and vice versa; and
 - evaluate algebraic expressions for given replacement values of the variables.
- 7.14 The student will
- solve one- and two-step linear equations in one variable; and
 - solve practical problems requiring the solution of one- and two-step linear equations.
- 7.15 The student will
- solve one-step inequalities in one variable; and
 - graph solutions to inequalities on the number line.
- 7.16 The student will apply the following properties of operations with real numbers:
- the commutative and associative properties for addition and multiplication;
 - the distributive property;
 - the additive and multiplicative identity properties;
 - the additive and multiplicative inverse properties; and
 - the multiplicative property of zero.