Virginia

Standards of Learning Assessments

Blueprint

Grade 5

Mathematics Test

for the

2001 Mathematics Standards of Learning

This revised blueprint will be effective with the 2005-2006 administration of the Standards of Learning Tests.

Grade 5 Mathematics Blueprint

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Standards of Learning (SOL) Test Blueprint

Introduction

What is a test blueprint?

A test blueprint is a guide for test construction and use. The Standards of Learning (SOL) test blueprints serve a number of purposes. They serve as a guide to test developers as they write test questions and construct the SOL tests. These blueprints also serve as a guide to educators, parents, and students in that they show:

(a) the SOL covered by the test and which, if any, have been excluded;
(b) which SOL are assigned to each reporting category;
(c) the number of test items in each reporting category and on the total test;
(d) general information about how the test questions were constructed; and
(e) the materials that students are allowed to use while taking the test.

How is the test blueprint organized?

The blueprint contains the following information:

1. **Test Development Guidelines:** guidelines used by the testing contractor and the members of the Content Review Committees in developing the SOL tests. This section contains three parts:

   A. General Considerations — lists general considerations that are used in developing the test as well as considerations specific to a particular content area.

   B. Ancillary Materials — lists any materials that students are allowed to use while taking the test.

2. **Blueprint Summary Table:** a summary of the blueprint which displays the following information:

   - reporting categories for the test;
   - number of test items in each reporting category;
   - Standards of Learning (SOL) included in each reporting category. SOL are identified by numbers and letters that correspond to the original SOL document;
   - SOL which are excluded from the SOL test;
   - number of operational items on the test;
   - number of field-test items on the test; and
   - total number of items (operational and field-test items) on the test.

3. **Expanded Blueprint:** provides the same information as the Blueprint Summary Table except that the full text of each SOL is included.

What is a reporting category?

Each test assesses a number of SOL. In the test blueprint, SOL are grouped into categories that represent related content or skills. These categories are labeled *Reporting Categories*. For example, a reporting category for the Grade 5 Mathematics 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 in terms of scores for each reporting category and a total test score.

Are some SOL assigned to more than one reporting category?

In grade 5 mathematics, each standard, as well as each letter under a standard, is assigned to only one reporting category.

Will all SOL listed in the blueprint be assessed each time the SOL tests are given?

Each SOL will not be assessed on every SOL test form. To keep the length of a test reasonable, the test will measure a selection of the SOL within a reporting category. However, every SOL that is not excluded in the blueprint is eligible for inclusion on each form of an SOL test. Over time all SOL in a reporting category will be assessed.

Grade 5 Mathematics Test Development Guidelines

A. General Considerations

1. All items included in this test will address the knowledge and skills specified in the 2001 Virginia Standards of Learning in Mathematics for grade 5.

2. Items will be examined for any content or context that stereotypes, offends, or unfairly penalizes students based on age, gender, economic status, race, ethnicity, religion, or geographic region.

3. The test will be untimed. The test will be administered in two sections, one in which calculator use is permitted and one in which it is prohibited. Students will be provided with a brief break between sections.

4. There is no penalty for guessing. Students' scores will be based on the number of correct answers out of the total number of operational items on the test.

5. Students will be permitted to use a protractor or angle ruler during the test.

6. Students will be permitted to use a four-function calculator during the second section of the test.

7. Students will be permitted to use scratch paper at any time during the test.

8. Students will be permitted to use standard (e.g., inches) and metric rulers during the test.

9. Items will be grade-appropriate in terms of difficulty, interest, and reading level.

10. Where appropriate, "real-life" examples and situations that the student would likely encounter will be used to present data or ask questions.

B. Ancillary Materials

Refer to the current examiner's manual or the Department of Education's Web site for ancillary materials that may be used.

Grade 5 Mathematics Test
Blueprint Summary Table

Reporting Categories	Number of Items	Grade 5 SOL
Number and Number Sense	8	5.1a,b,c 5.2a,b
Computation and Estimation	12	5.3 5.4 5.5 5.6 5.7
Measurement and Geometry	12	5.8 5.9 5.10 5.11a,b,c,d,e 5.12 5.13 5.14 5.15a,b,c,d,e 5.16
Probability and Statistics	8	5.17a,b,c 5.18 5.19
Patterns, Functions, and Algebra	10	5.20 5.21a,b,c 5.22
SOL Excluded From This Test		None
Total Number of Operational Items	50	
Field Test Items*	10	
Total Number of Items	60	

*These field test items will *not* be used to compute students' scores on the test.

Expanded Blueprint

Reporting Category: Number and Number Sense
Number of Items: 8

Grade 5 SOL in This Reporting Category:

5.1 The student will
a) read, write, and identify the place values of decimals through thousandths;
b) round decimal numbers to the nearest tenth or hundredth; and
c) compare the values of two decimals through thousandths, using the symbols >, <, or =.

5.2 The student will
a) recognize and name commonly used fractions (halves, fourths, fifths, eighths, and tenths) in their equivalent decimal form and vice versa; and
b) order a given set of fractions and decimals from least to greatest. Fractions will include like and unlike denominators limited to 12 or less, and mixed numbers.

Reporting Category: Computation and Estimation
Number of Items: 12

Grade 5 SOL in This Reporting Category:

5.3 The student will create and solve problems involving addition, subtraction, multiplication, and division of whole numbers, using paper and pencil, estimation, mental computation, and calculators.

5.4 The student will find the sum, difference, and product of two numbers expressed as decimals through thousandths, using an appropriate method of calculation, including paper and pencil, estimation, mental computation, and calculators.

5.5 The student, given a dividend of four digits or fewer and a divisor of two digits or fewer, will find the quotient and remainder.

5.6 The student, given a dividend expressed as a decimal through thousandths and a single-digit divisor, will find the quotient.

5.7 The student will add and subtract with fractions and mixed numbers, with and without regrouping, and express answers in simplest form. Problems will include like and unlike denominators limited to 12 or less.

Reporting Category: Measurement and Geometry
Number of Items: 12

Grade 5 SOL in This Reporting Category:

5.8 The student will describe and determine the perimeter of a polygon and the area of a square, rectangle, and right triangle, given the appropriate measures.

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

5.10 The student will differentiate between perimeter, area, and volume and identify whether the application of the concept of perimeter, area, or volume is appropriate for a given situation.

5.11 The student will choose an appropriate measuring device and unit of measure to solve problems involving measurement of

a) length—part of an inch (1/2, 1/4, and 1/8), inches, feet, yards, miles, millimeters, centimeters, meters, and kilometers;
b) weight/mass—ounces, pounds, tons, grams, and kilograms;
c) liquid volume—cups, pints, quarts, gallons, milliliters, and liters;
d) area—square units; and
e) temperature—Celsius and Fahrenheit units.
Problems also will include estimating the conversion of Celsius and Fahrenheit units relative to familiar situations (water freezes at 0°C and 32°F, water boils at 100°C and 212°F, normal body temperature is about 37°C and 98.6°F).

5.12 The student will determine an amount of elapsed time in hours and minutes within a 24-hour period.

5.13 The student will measure and draw right, acute, and obtuse angles and triangles, using appropriate tools.

5.14 The student will classify angles and triangles as right, acute, or obtuse.

5.15 The student, using two-dimensional (plane) figures (square, rectangle, triangle, parallelogram, rhombus, kite, and trapezoid) will

a) recognize, identify, describe, and analyze their properties in order to develop definitions of these figures;
b) identify and explore congruent, noncongruent, and similar figures;
c) investigate and describe the results of combining and subdividing shapes;
d) identify and describe a line of symmetry; and
e) recognize the images of figures resulting from geometric transformations such as translation (slide), reflection (flip), or rotation (turn).

5.16 The student will identify, compare, and analyze properties of three-dimensional (solid) geometric shapes (cylinder, cone, cube, square pyramid, and rectangular prism).

Reporting Category: Probability and Statistics
Number of Items: 8

Grade 5 SOL in This Reporting Category:

5.17 The student will
- a) solve problems involving the probability of a single event by using tree diagrams or by constructing a sample space representing all possible results;
- b) predict the probability of outcomes of simple experiments, representing it with fractions or decimals from 0 to 1, and test the prediction; and
- c) create a problem statement involving probability and based on information from a given problem situation. Students will not be required to solve the created problem statement.

5.18 The student will, given a problem situation, collect, organize, and display a set of numerical data in a variety of forms, using bar graphs, stem-and-leaf plots, and line graphs, to draw conclusions and make predictions.

5.19 The student will find the mean, median, mode, and range of a set of data.

Reporting Category: Patterns, Functions, and Algebra
Number of Items: 10

Grade 5 SOL in This Reporting Category:

5.20 The student will analyze the structure of numerical and geometric patterns (how they change or grow) and express the relationship, using words, tables, graphs, or a mathematical sentence. Concrete materials and calculators will be used.

5.21 The student will
- a) investigate and describe the concept of variable;
- b) use a variable expression to represent a given verbal quantitative expression, involving one operation; and
- c) write an open sentence to represent a given mathematical relationship, using a variable.

5.22 The student will create a problem situation based on a given open sentence using a single variable.