Appendix 2-L: Test Development Partner Report: Operational Mathematics Blueprint

NCSC Operational Mathematics Test Blueprint

The tables presented in this appendix constitute the NCSC operational mathematics blueprint. The tables incorporate the overall content distributions used for the operational test. Each grade level/content area is represented by a table, which first describes the content category (e.g., Number and Operations Base 10), weights per CCC, standards (CCCs), item types, score point range, and reports the approximate overall scoring weights by content category by grade.

Please note that the content of the tables may need refinement pending data from operational. Therefore, item counts in this document are preliminary and may change for subsequent operational summative assessments.

Table A1. NCSC Operational Test Blueprint – Mathematics Grade 3

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Operations and Algebraic Thinking	28-32%	3.NO.2d3 Solve multiplication problems with neither number greater than 5	SR	3–4
		3.NO.2e1* Solve or solve and check one- or two-step word problems requiring addition, subtraction, or multiplication with answers up to 100	SR	3–4
		3.PRF.2d1 Identify multiplication patterns in a real word setting	SR	3–4
Number and Operations Base Ten	17-23%	3.NO.1j3 Use place value to round to the nearest 10 or 100	SR	3–4
		3.NO.2c1 Solve multi-step addition and subtraction problems up to 100	SR	3–4
Number and Operations Fractions	17-23%	3.NO.1l3 Identify the fraction that matches the representation (rectangles and circles; halves, fourths, thirds, and eighths)	SR	3–4
		3.SE.1g1 Use =, <, or > to compare 2 fractions with the same numerator or denominator	SR	3–4
Measurement and Data	17-23%	3.DPS.1g1 Collect data; organize into picture or bar graph	SR/CR	3–4
		3.ME.1d2 Measure area of rectilinear figures by counting squares	SR	3–4
Geometry	9-11%	3.GM.1i1 Partition rectangles into equal parts with equal area	SR	3–4
Total**	100%			30-40

* This CCC requires a pair of math item versions.

**The intended operational score is to be derived from 35 raw score points.

Table A2. NCSC Operational Test Blueprint – Mathematics Grade 4

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Operations and Algebraic Thinking	28-32%	4.NO.2d7 Determine how many objects go into each group when given the total number of objects and groups where the number in each group or number of groups is not > 10	SR	3–4
		4.PRF.1e3 Solve multiplicative comparisons with an unknown using up to 2-digit numbers with information presented in a graph or word problem (e.g., an orange hat cost $3. A purple hat cost 2 times as much. How much does the purple hat cost? [3 x 2 = p])	SR	3–4
		4.NO.2e2* Solve or solve and check one or two step word problems requiring addition, subtraction, or multiplication with answers up to 100	SR	3–4
Number and Operations Base Ten	9-11%	4.NO.1j5 Use place value to round to any place (i.e., ones, tens, hundreds, thousands)	SR	3–4
Number and Operations Fractions	28-32%	4.NO.1m1 Determine equivalent fractions	SR	3–4
		4.NO.1n2 Compare up to 2 given fractions that have different denominators	SR	3–4
		4.SE.1g2 Use =, <, or > to compare 2 fractions (fractions with a denominator or 10 or less)	SR	3–4
Measurement and Data	17-23%	4.ME.1g2 Solve word problems using perimeter and area where changes occur to the dimensions of a rectilinear figure	SR	3–4
		4.DPS.1g3 Collect data; organize in graph (e.g. picture graph, line plot, bar graph)	SR/CR	3–4
Geometry	9-11%	4.GM.1h2 Classify two-dimensional shapes based on attributes (# of angles)	SR/CR	3–4
Total**	100%			30-40

* This CCC requires a pair of math item versions.

**The intended operational score is to be derived from 35 raw score points.

Table A3. NCSC Operational Test Blueprint – Mathematics Grade 5

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Operations and Algebraic Thinking	9-11%	5.PRF.2b1 Generate or select a comparison between two graphs from a similar situation	SR	3–4
Number and Operations Base Ten	34-40%	5.NO.1b1 Read, write, or select a decimal to the hundredths place	SR	3–4
		5.NO.1b4 Round decimals to the next whole number	SR	3–4
		5.NO.2c1 Solve one-step problems using decimals	SR	3–4
		5.NO.2a5 Solve word problems that require multiplication or division	SR	3–4
Number and Operations Fractions	17-23%	5.NO.2c2 Solve word problems involving the addition, subtraction, multiplication, or division of fractions	SR	3–4
		5.PRF.1a1 Determine whether the product will increase or decrease based on the multiplier	SR	3–4
Measurement and Data	17-23%	5.ME.1b2 Convert standard measurements of length	SR	3–4
		5.ME.2a1 Use a calculator to solve one-step problems involving conversions of standard measurement units of area, volume, time, mass in the same system	SR	3–4
Geometry	9-11%	5.GM.1c3 Use order pairs to graph given points	SR/CR	3–4
Total*	100%			30-40

*The intended operational score is to be derived from 35 raw score points.

Table A4. NCSC Operational Test Blueprint – Mathematics Grade 6

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Ratio and Proportions	28-32%	6.PRF.1c1 Describe the ratio relationship between two quantities for a given situation	SR	3–4
		6.ME.2a2 Solve one-step real world measurement problems involving unit rates with ratios of whole numbers when given the unit rate (3 inches of snow falls per hour, how much in 6 hours?)	SR	3–4
		6.NO.1f1 Find a percent of a quantity as rate per 100	SR	3–4
Expressions and Equations	17-23%	6.PRF.1d1 Solve real world single-step linear equations	SR	3–4
		6.NO.2a6 Solve problems or word problems using up to three-digit numbers and any of the four operations	SR	3–4
The Number System	28-32%	6.NO.2c3 Solve one-step, addition, subtraction, multiplication, or division problems with fractions or decimals	SR	3–4
		6.NO.1d4 Select the appropriate meaning of a negative number in a real world situation	SR	3–4
		6.NO.1d2* Locate positive and negative numbers on a number line	SR	3–4
Statistics and Probability	9-11%	6.DPS.1d3* Select the statement that matches mean, mode, and spread of data for 1 measure of central tendency for a given data set	SR	3–4
Geometry	9-11%	6.GM.1d1 Find area of quadrilaterals	SR	3–4
Total**	100%			30-40

* This CCC requires a pair of math item versions.

**The intended operational score is to be derived from 35 raw score points.

Table A5. NCSC Operational Test Blueprint – Mathematics Grade 7

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Ratio and Proportions	34-40%	7.NO.2f1 Identify the proportional relationship between two quantities (use rules or symbols to show quantitative relationships)	SR	3–4
		7.NO.2f2 Determine if two quantities are in a proportional relationship using a table of equivalent ratios or points graphed on a coordinate plane	SR	3–4
		7.NO.2f6 Solve word problems involving ratios	SR	3–4
		7.PRF.1f1 Use proportional relationships to solve multistep percent problems in real world situations.	SR	3–4
Expressions and Equations	9-11%	7.PRF.1g2 Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities	SR	3–4
The Number System	17-23%	7.NO.2i1 Solve multiplication problems with positive/negative numbers	SR	3–4
		7.NO.2i2 Solve division problems with positive/negative numbers	SR	3–4
Statistics and Probability	9-11%	7.DPS.1k1 Analyze graphs to determine or select appropriate comparative inferences about two samples or populations	SR	3–4
Geometry	17-23%	7.ME.2d1 Apply formula to measure area and circumference of circles	SR	3–4
		7.GM.1h2 Find the surface area of three-dimensional figures using nets of rectangles or triangles	SR	3–4
Total*	100%			30-40

*The intended operational score is to be derived from 35 raw score points.

Table A6. NCSC Operational Test Blueprint – Mathematics Grade 8

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Functions	17-23%	8.PRF.2e2* Identify the rate of change (slope) and initial value (*y*-intercept) from graphs	SR	3–4
		8.PRF.1f2 Describe or select the relationship between the two quantities given a line graph of a situation	SR	3–4
Expressions and Equations	17-23%	8.PRF.1e2 Represent proportional relationships on a line graph	SR	3–4
		8.PRF.1g3 Solve linear equations with 1 variable	SR	3–4
The Number System	9-11%	8.NO.1k3 Use approximations of irrational numbers to locate them on a number line	SR	3–4
Statistics and Probability	17-23%	8.DPS.1h1* Graph bivariate data using scatter plots and identify possible associations between the variables	SR/CR	3–4
		8.DPS.1k2 Analyze displays of bivariate data to develop or select appropriate claims about those data	SR	3–4
Geometry	28-32%	8.ME.1e1 Describe the changes in surface area, area, and volume when the figure is changed in some way (e.g., scale drawings)	SR	3–4
		8.GM.1g1* Recognize congruent and similar figures	SR	3–4
		8.ME.2d2 Apply the formula to find the volume of 3-dimensional shapes (i.e., cubes, spheres, and cylinders)	SR	3–4
Total**	100%			30-40

* This CCC requires a pair of math item versions.

**The intended operational score is to be derived from 35 raw score points.

Table A7. NCSC Operational Test Blueprint – Mathematics Grade 11

Content Category	Weight	Core Content Connector	Item Type	Score Point Range
Algebra And Functions	47-52%	H.PRF.2b1 Translate a real-world problem into a one-variable linear equation	SR	3–4
		H.PRF.2b2 Solve equations with one or two variables using equations or graphs	SR	3–4
		H.ME.1b2 Solve a linear equation to find a missing attribute given the area, surface area, or volume and the other attribute	SR	3–4
		H.PRF.1c1 Select the appropriate graphical representation of a linear model based on real world events	SR	3–4
		H.PRF.2c1 Make predictions based on a given model (for example, a weather model, data for athletes over years)	SR	3–4
Number and Quantity	17-23%	H.ME.1a2 Solve real world problems involving units of measurement	SR	3–4
		H.NO.1a1 Simplify expressions that include exponents	SR	3–4
Statistics and Probability	17-23%	H.DPS.1b1 Complete a graph given the data, using dot plots, histograms, or box plots	SR/CR	3–4
		H.DPS.1c1 Use descriptive stats, range, median, mode, mean, outliers/gaps, to describe data set	SR	3–4
Geometry	9-11%	H.GM.1b1 Use definitions to demonstrate congruency and similarity in figures	SR	3–4
Total*	100%			30-40

*The intended operational score is to be derived from 35 raw score points.