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National Center and State Collaborative

CCSS, Prioritized Mathematics CCCs, and Essential Understandings

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The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with significant cognitive disabilities. The project draws on a strong research base to develop an AA-AAS that is built from the ground up on powerful validity arguments linked to clear learning outcomes and defensible assessment results, to complement the work of the Race to the Top Common State Assessment Program (RTTA) consortia.

Our long-term goal is to ensure that students with significant cognitive disabilities achieve increasingly higher academic outcomes and leave high school ready for post-secondary options. A well-designed summative assessment alone is insufficient to achieve that goal. Thus, NCSC is developing a full system intended to support educators, which includes formative assessment tools and strategies, professional development on appropriate interim uses of data for progress monitoring, and management systems to ease the burdens of administration and documentation. All partners share a commitment to the research-to-practice focus of the project and the development of a comprehensive model of curriculum, instruction, assessment, and supportive professional development. These supports will improve the alignment of the entire system and strengthen the validity of inferences of the system of assessments.

IDEAs that Work
U.S. Office of Special Education Programs

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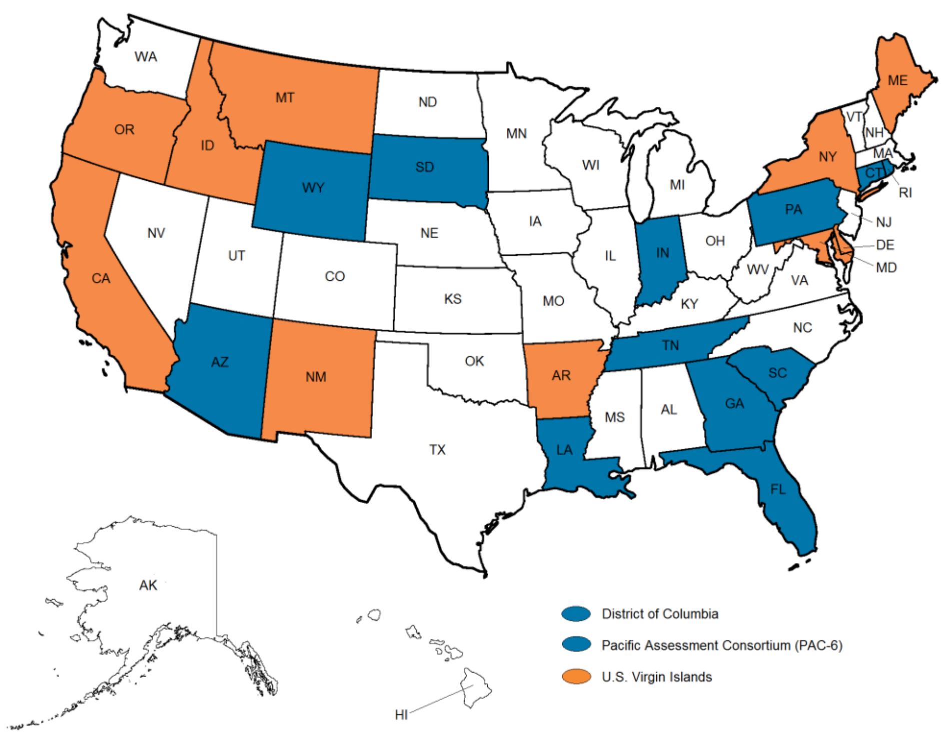
NCSC is a collaborative of 14 states and five organizations.

The states include (shown in blue on map): Arizona, Connecticut, District of Columbia, Florida, Georgia, Indiana, Louisiana, Pacific Assessment Consortium (PAC-6)[1], Pennsylvania, Rhode Island, South Carolina, South Dakota, Tennessee, and Wyoming.

Tier II states are partners in curriculum, instruction, and professional development implementation but are not part of the assessment development work. They are (shown in orange on map): Arkansas, California, Delaware, Idaho, Maine, Maryland, Montana, New Mexico, New York, Oregon, and U.S. Virgin Islands.



*Core partner states are blue in color and Tier II states are orange in color.

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[1] The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).

National Center and State Collaborative

The five partner organizations include: The National Center on Educational Outcomes (NCEO) at the University of Minnesota, The National Center for the Improvement of Educational Assessment (Center for Assessment), The University of North Carolina at Charlotte, The University of Kentucky, and edCount, LLC.

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NCSC CCSS, Prioritized Mathematics CCCs, and EUs for Grade 3

Domain	CCSS	CCC	Essential Understandings
Operations & Algebraic Thinking	**3.OA.A.1** Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. *For example, describe a context in which a total number of objects can be expressed as 5 × 7*.	**3.NO.2d3** Solve multiplication problems with neither number greater than 5.	Create an array of sets (e.g., 3 rows of 2).
Operations & Algebraic Thinking	**3.OA.D.8** Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	**3.NO.2e1** Solve or solve and check one or two-step word problems requiring addition, subtraction or multiplication with answers up to 100.	Combine (+), decompose (-), and multiply (x) with concrete objects; use counting to get the answers. Match the action of combining with vocabulary (i.e., in all; altogether) or the action of decomposing with vocabulary (i.e., have left; take away) in a word problem.
Operations & Algebraic Thinking	**3.OA.D.9** Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends*.	**3.PRF.2d1** Identify multiplication patterns in a real world setting.	Concrete understanding of a pattern as a set that repeats regularly or grows according to a rule; Ability to identify a pattern that grows (able to show a pattern) (shapes, symbols, objects).

Domain	CCSS	CCC	Essential Understandings
Number & Operations in Base Ten	**3.NBT.A.1** Use place value understanding to round whole numbers to the nearest 10 or 100.	**3.NO.1j3** Use place value to round to the nearest 10 or 100.	Identify ones or tens in bundled sets – Similar/different with concrete representations (i.e., is this set of manipulatives (8 ones) closer to this set (a ten) or this set (a one)?).
Number & Operations in Base Ten	**3.NBT.A.2** Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	**3.NO.2c1** Solve multi-step addition and subtraction problems up to 100.	Combine (+) or decompose (-) with concrete objects; use counting to get the answers.
Number & Operations—Fractions	**3.NF.A.1** Understand a fraction 1/*b* as the quantity formed by 1 part when *a* whole is partitioned into *b* equal parts; understand a fraction *a*/*b* as the quantity formed by a parts of size 1/*b*.	**3.NO.1l3** Identify the fraction that matches the representation (rectangles and circles; halves, fourths, and thirds, eighths).	Identify part and whole when item is divided. Count the number of the parts selected (3 of the 4 parts; have fraction present but not required to read ¾).
Number & Operations—Fractions	**3.NF.A.3d** Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**3.SE.1g1** Use =, <, or > to compare two fractions with the same numerator or denominator.	Concrete representation of a fractional part of a whole as greater than, less than, equal to another.

Domain	CCSS	CCC	Essential Understandings
Measurement & Data	**3.MD.B.3** Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step "how many more" and "how many less" problems using information presented in scaled bar graphs. *For example, draw a bar graph in which each square in the bar graph might represent 5 pets*.	**3.DPS.1g1** Collect data, organize into picture or bar graph.	Organize data into a graph using objects (may have number symbols).
Measurement & Data	**3.MD.C.6** Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	**3.ME.1d2** Measure area of rectangular figures by counting squares.	Ability to identify the area of a rectangular figure.
Geometry	**3.G.A.2** Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. *For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.*	**3.GM.1i1** Partition rectangles into equal parts with equal area.	Concept of equal parts; Partitioning with concrete objects; Find the rectangle that is the same or match two congruent rectangles.

NCSC CCSS, Prioritized Mathematics CCCs, and EUs for Grade 4

Domain	CCSS	CCCs	Essential Understandings
Operations & Algebraic Thinking	**4.OA.A.1** Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	**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.	Create an array of objects given a specific number of rows and the total number, place one object in each group/row at a time.
Operations & Algebraic Thinking	**4.OA.A.2** Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	**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]).	Identify visual multiplicative comparisons (e.g., which shows two times as many tiles as this set?).
Operations & Algebraic Thinking	**4.OA.A.3** Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	**4.NO.2e2** Solve or solve and check one or two step word problems requiring addition, subtraction, or multiplication with answers up to 100.	Select the representation of manipulatives on a graphic organizer to show addition/multiplication equation; Match to same for representations of equations with equations provided (may be different objects but same configuration).

Domain	CCSS	CCCs	Essential Understandings
Number & Operations in Base Ten	**4.NBT.A.3** Use place value understanding to round multi-digit whole numbers to any place.	**4.NO.1j5** Use place value to round to any place (i.e., ones, tens, hundreds, thousands).	Identify ones, tens, hundreds in bundled sets – Similar/different with concrete representations (i.e., is this set of manipulatives (8 tens) closer to this set (a hundred) or this set (a ten)?).
Number & Operations—Fractions	**4.NF.A.1** Explain why a fraction a/b is equivalent to a fraction $(n \times a)/(n \times b)$ by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	**4.NO.1m1** Determine equivalent fractions.	Equivalency: what is and what is not equivalent; this may begin with numbers/sets of objects: e.g., 3=3 or two fraction representations that are identical (two pies showing 2/3).
Number & Operations—Fractions	**4.NF.A.2** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**4.NO.1n2** Compare up to 2 given fractions that have different denominators.	Differentiate between parts and a whole.

Domain	CCSS	CCCs	Essential Understandings
Number & Operations—Fractions	**4.NF.A.2** Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	**4.SE.1g2** Use =, <, or > to compare 2 fractions (fractions with a denominator of 10 or less).	Concrete representation of a fractional part of a whole as greater than, less than, equal to another.
Measurement & Data	**4.MD.A.3** Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor*.	**4.ME.1g2** Solve word problems using perimeter and area where changes occur to the dimensions of a rectilinear figure.	Identify the perimeter; Identify the area; Show each when size of figure changes.
Measurement & Data	**4.MD.B.4** Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. *For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection*.	**4.DPS.1g3** Collect data, organize in graph (e.g. picture graph, line plot, bar graph).	Identify data set based on a single attribute (e.g., pencils vs. markers); Identify data set with more or less (e.g., this bar represents a set with more); Organize the data into a graph using objects (may have number symbols).

Domain	CCSS	CCCs	Essential Understandings
Geometry	**4.G.A.2** Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	**4GM.1h2** Classify two-dimensional shapes based on attributes (# of angles).	Identify attributes within a 2-dimensional figure (e.g., rectangles have sides – student identifies sides of rectangle – and angles – student identifies angles in rectangle).

NCSC CCSS, Prioritized Mathematics CCCs, and EUs for Grade 5

Domain	CCSS	CCCs	Essential Understandings
Operations & Algebraic Thinking	**5.OA.B.3** Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. *For example, given the rule “Add 3” and the starting number 0, and given the rule “Add 6” and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so*.	**5.PRF.2b1** Generate or select a comparison between two graphs from a similar situation.	Compare two pieces of information provided in a single display.
Number & Operations in Base Ten	**5.NBT.A.3a** Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 × 100 + 4 × 10 + 7 × 1 + 3 × (1/10) + 9 × (1/100) + 2 × (1/1000).	**5.NO.1b1** Read, write, or select a decimal to the hundredths place.	Recognize part whole using materials divided into tenths – Count tenths to determine how many (e.g.,4 tenths) (.4 have the decimal present but not required to read).
Number & Operations in Base Ten	**5.NBT.A.4** Use place value understanding to round decimals to any place.	**5.NO.1b4** Round decimals to the next whole number.	Identify place value to the ones, tens, hundreds, thousands.

Domain	CCSS	CCCs	Essential Understandings
Number & Operations in Base Ten	**5.NBT.B.6** Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	**5.NO.2a5** Solve word problems that require multiplication or division.	Combine (x) or decompose (÷) with concrete objects; use counting to get the answers.
Number & Operations in Base Ten	**5.NBT.B.7** Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.	**5.NO.2c1** Solve 1 step problems using decimals.	Combine (+) or decompose (-) with concrete objects; use counting to get the answers; Match the action of combining with vocabulary (i.e., in all; altogether) or the action of decomposing with vocabulary (i.e., have left; take away) in a word problem.
Number & Operations—Fractions	**5.NF.A.2** Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.*	**5.NO.2c2** Solve word problems involving the addition, subtraction, multiplication or division of fractions.	Identify what to do with the parts when given the key word (using the fractional parts).

Domain	CCSS	CCCs	Essential Understandings
Number & Operations—Fractions	**5.NF.B.5b** Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of fraction equivalence $a/b = (n \times a)/(n \times b)$ to the effect of multiplying a/b by 1.	**5.PRF.1a1** Determine whether the product will increase or decrease based on the multiplier.	Limit to whole numbers and 1 or more; Show what happens to set when have one of these (1x) versus some other number (e.g., 2x).
Measurement & Data	**5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**5.ME.1b2** Convert standard measurements of length.	To measure an object or quantity using 2 different units to show they mean the same thing (e.g., 12 inches and 1 foot). If larger unit, there are less; smaller units, you need more.
Measurement & Data	**5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	**5.ME.2a1** Solve problems involving conversions of standard measurement units when finding area, volume, time-lapse, or mass.	Identify what measures time (clock used to measure time; calendar used to measure days); identify past/present (for lapsed time).

Domain	CCSS	CCCs	Essential Understandings
Geometry	**5.G.A.1** Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	**5.GM.1c3** Use ordered pairs to graph given points.	Identify the x- and y-axis; or concept of intersection.

NCSC CCSS, Prioritized Mathematics CCCs, and EUs for Grade 6

Domain	CCSS	CCCs	Essential Understandings
Ratios & Proportional Relationships	**6.RP.A.1** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. *For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."*	**6.PRF.1c1** Describe the ratio relationship between two quantities for a given situation.	Match/identify a simple ratio (1:X) to the relationship between two quantities.
Ratios & Proportional Relationships	**6.RP.A.3c** Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.	**6.NO.1f1** Find a percent of a quantity as rate per 100.	State a relationship to a quantity out of 100.

Domain	CCSS	CCCs	Essential Understandings
The Number System	**6.NS.A.1** Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. *For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3) ÷ (3/4) = 8/9 because 3/4 of 8/9 is 2/3. (In general, (a/b) ÷ (c/d) = ad/bc.) How much chocolate will each person get if 3 people share 1/2 lb of chocolate equally? How many 3/4-cup servings are in 2/3 of a cup of yogurt? How wide is a rectangular strip of land with length 3/4 mi and area 1/2 square mi?*. **6.NS.B.3** Fluently add, subtract, multiply, and divide multi-digit decimals using the standard algorithm for each operation.	**6.NO.2c3** Solve one-step, addition, subtraction, multiplication, or division problems with fractions or decimals.	Concept of +, -, x, ÷. Concept of fraction and decimal. Use concrete object to represent the removal (subtraction) or addition of one half from/to a whole object.

Domain	CCSS	CCCs	Essential Understandings
The Number System	**6.NS.C.5** Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.	**6.NO.1d4** Select the appropriate meaning of a negative number in a real world situation.	Ability to select the appropriate representation of more than or less than 0 in a real world situation.
The Number System	**6.NS.C.6a** Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g., –(–3) = 3, and that 0 is its own opposite.	**6.NO.1d2** Locate positive and negative numbers on a number line.	Recognize how values/numbers lie on either side of zero.
Expressions & Equations	**6.EE.A.2** Write, read, and evaluate expressions in which letters stand for numbers.	**6.PRF.1d1** Solve real world single-step linear equations.	Recognize the intended outcome of a word problem based on a linear equation.

Domain	CCSS	CCCs	Essential Understandings
Expressions & Equations	**6.EE.C.9** Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation. For example, in a problem involving motion at constant speed, list and graph ordered pairs of distances and times, and write the equation d = 65t to represent the relationship between distance and time.	**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).	Identify a familiar unit rate.
Expressions & Equations	**6.EE.B.7** Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.	**6.NO.2a6** Solve problems or word problems using up to three digit numbers and any of the four operations.	Decompose (÷) with concrete objects; use counting to get the answer.

Domain	CCSS	CCCs	Essential Understandings
Geometry	**6.G.A.1** Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	**6.GM.1d1** Find the area of quadrilaterals.	Use manipulatives to measure the area of a rectangle (e.g., tiling).
Statistics & Probability	**6.SP.A.2** Understand that a set of data collected to answer a statistical question has a distribution which can be described by its center, spread, and overall shape.	**6.DPS.1d3** Select statement that matches mean, mode, and spread of data for 1 measure of central tendency for given data set.	Identify the highest and lowest value in a data set given a number line and matching symbols; Identify the representation (Plastic snap cubes, wiki sticks) of the mode; Use concrete materials to produce the mean (leveled plastic snap cubes).

NCSC CCSS, Prioritized Mathematics CCCs, and EUs for Grade 7

Domain	CCSS	CCCs	Essential Understandings
Ratios & Proportional Relationships	**7.RP.A.2** Recognize and represent proportional relationships between quantities.	**7.NO.2f1** Identify the proportional relationship between two quantities (use rules or symbols to show quantitative relationships).	Recognize the constancy of one object to its parts (i.e., one fact, two eyes).
Ratios & Proportional Relationships	**7.RP.A.2a** Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin. **7.RP.A.2b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	**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.	Use a table to recognize the quantity of two entries, without counting, to determine which is relatively larger.
Ratios & Proportional Relationships	**7.RP.A.3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	**7.PRF.1f1** Use proportional relationships to solve multistep percent problems in real world situations.	Identify how one variable changes in relation to another variable in a directly proportional relationship (e.g., a/b = c/d, if a increases, what will happen to c?).
Ratios & Proportional Relationships	**7.RP.A.3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	**7.NO.2f6** Solve word problems involving ratios.	Show rate when asked; Show proportion when asked; Select a set for the ratio given (Maria stamps three letters every minute which we write as 3:1. Show me the letters she stamps in a minute).

Domain	CCSS	CCCs	Essential Understandings
The Number System	**7.NS.A.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	**7.NO.2i1** Solve multiplication problems with positive/negative numbers.	Create an array of objects for the mathematical equation and match answer symbol (+ or -) following multiplication rules for an equation.
The Number System	**7.NS.A.2** Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	**7.NO.2i2** Solve division problems with positive/negative numbers.	Create an array of objects for the mathematical equation and match answer symbol (+ or -) following division rules for an equation.
Expressions & Equations	**7.EE.B.4** 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.	**7.PRF.1g2** Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and in-equalities to solve problems by reasoning about the quantities.	Record/replace a variable in an equation with a fact from a story on a graphic organizer.
Geometry	**7.G.B.4** Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	**7.ME.2d1** Apply formula to measure area and circumference of circles.	Recognize the area of a circle and the circumference when shown a graphic representation.
Geometry	**7.G.B.6** Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	**7.GM.1h2** Find the surface area of three-dimensional figures using nets of rectangles or triangles.	Demonstrate the concept of the surface area of a rectangular prism; Fill rectangular prism.

Domain	CCSS	CCCs	Essential Understandings
Statistics & Probability	**7.SP.B.4** Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book*.	**7.DPS.1k1** Analyze graphs to determine or select appropriate comparative inferences about two samples or populations.	Understand basic information from simple graphs (e.g., interpret a bar graph using the understanding that the taller column on a graph has a higher frequency, the shorter column on a graph has a lower frequency).

NCSC CCSS, Prioritized Mathematics CCCs, and EUs for Grade 8

Domain	CCSS	CCCs	Essential Understandings
The Number System	**8.NS.A.2** Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of √2, show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*.	**8.NO.1k3** Use approximations of irrational numbers to locate them on a number line.	Recognize how values/numbers can lie between whole number values on a number line.
Expressions & Equations	**8.EE.B.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	**8.PRF.1e2** Represent proportional relationships on a line graph.	Recognize a positive relationship between two variables.
Expressions & Equations	**8.EE.C.7** Solve linear equations in one variable.	**8.PRF.1g3** Solve linear equations with 1 variable.	Use manipulatives or graphic organizer to solve a problem.

Domain	CCSS	CCCs	Essential Understandings
Functions	**8.F.B.4** Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (*x, y*) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	**8.PRF.2e2** Identify the rate of change (slope) and initial value (y-intercept) from graphs.	Indicate the point on a line that crosses the y-axis.
Functions	**8.F.B.5** Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	**8.PRF.1f2** Describe or select the relationship between the two quantities given a line graph of the situation.	Use a graph to recognize the quantity in two sets, without counting, to determine which is relatively larger.

Domain	CCSS	CCCs	Essential Understandings
Geometry	**8.G.A.2** Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. **8.G.A.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	**8.GM.1g1** Recognize congruent and similar figures.	Demonstrate the concept of congruent and similar (e.g., match concrete examples of congruent shapes, match concrete examples of similar shapes).
Geometry	**8.G.A.4** Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	**8.ME.1e1** Describe the changes in surface area, area, and volume when the figure is changed in some way (e.g., scale drawings).	Recognize how the space inside a figure increases when the sides are lengthened.
Geometry	**8.G.C.9** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	**8.ME.2d2** Apply the formula to find the volume of 3-dimensional shapes (i.e., cubes, spheres, and cylinders).	Ability to recognize attributes of a 3-dimensional shape.

Domain	CCSS	CCCs	Essential Understandings
Statistics & Probability	**8.SP.A.1** Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	**8.DPS.1h1** Graph bivariate data using scatter plots and identify possible associations between the variable.	Locate points on the x-axis and y-axis of an adapted grid (not necessarily numeric).
Statistics & Probability	**8.SP.A.4** Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. *For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?*	**8.DPS.1k2** Analyze displays of bivariate data to develop or select appropriate claims about those data.	Use graphic supports (e.g., highlighted transparency of an association) to identify the appropriate statement when given a relationship between two variables.

NCSC CCSS, Prioritized Mathematics CCCs, and EUs for High School

Domain	CCSS	CCCs	Essential Understandings
Number and Quantity: The Real Number System	**HSN-RN.A.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents.	**HS.NO.1a1** Simplify expressions that include exponents.	Create an array with a number multiplied by itself (Show me 3 rows of 3).
Number and Quantity: Quantities	**HSN-Q.A.1** Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	**H.ME.1a2** Solve real world problems involving units of measurement.	Ability to solve real world measurement problems that require interpretation and use of a table.
Algebra: Creating Equations	**HSA-CED.A.1** Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions*.	**H.PRF.2b1** Translate a real-world problem into a one-variable linear equation.	Match an equation with one variable to the real world context.
Algebra: Creating Equations	**HSA-REI.A.1** Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	**H.PRF.2b2** Solve equations with one or two variables using equations or graphs.	Count and arrange a given number of objects into two sets in multiple combinations.
Algebra: Creating Equations	**HSA-REI.B.3** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	**H.ME.1b2** Solve a linear equation to find a missing attribute given the area, surface area, or volume and the other attribute.	Identify the unknown quantity when given an equation and labeled figure.

Domain	CCSS	CCCs	Essential Understandings
Functions: Interpreting Functions	**HSF-LE.A.1** Distinguish between situations that can be modeled with linear functions and with exponential functions.	**H.PRF.1c1** Select the appropriate graphical representation of a linear model based on real world events.	Match a point not on a line as not being part of a data set for a given line.
Functions: Interpreting Functions	**HSF-LE.A.3** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	**H.PRF. 2c1** Make predictions based on a given model (for example, a weather model, data for athletes over years).	Extend a graph when provided a relationship and two choices.
Geometry: Similarity, Right Triangles, & Trigonometry	**HSG-SRT.A.2** Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	**H.GM.1b1** Use definitions to demonstrate congruency and similarity in figures.	Identify the right angle within a given triangle; Identify sides and/or hypotenuse of a right triangle.
Statistics & Probability: Interpreting Categorical & Quantitative Data	**HSS-ID.A.1** Represent data with plots on the real number line (dot plots, histograms, and box plots).	**H.DPS.1b1** Complete a graph given the data, using dot plots, histograms, or box plots.	Make a connection between categories in a data table to the appropriate axis of a graph.

Domain	CCSS	CCCs	Essential Understandings
Statistics & Probability: Interpreting Categorical & Quantitative Data	**HSS-ID.A.2** Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.	**H.DPS.1c1** Use descriptive stats; range, median, mode, mean, outliers/gaps to describe data set.	Identify the highest and lowest value in a data set given a number line and matching symbols (concept of range).