Mathematics Instructional Families – Number Operations

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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.

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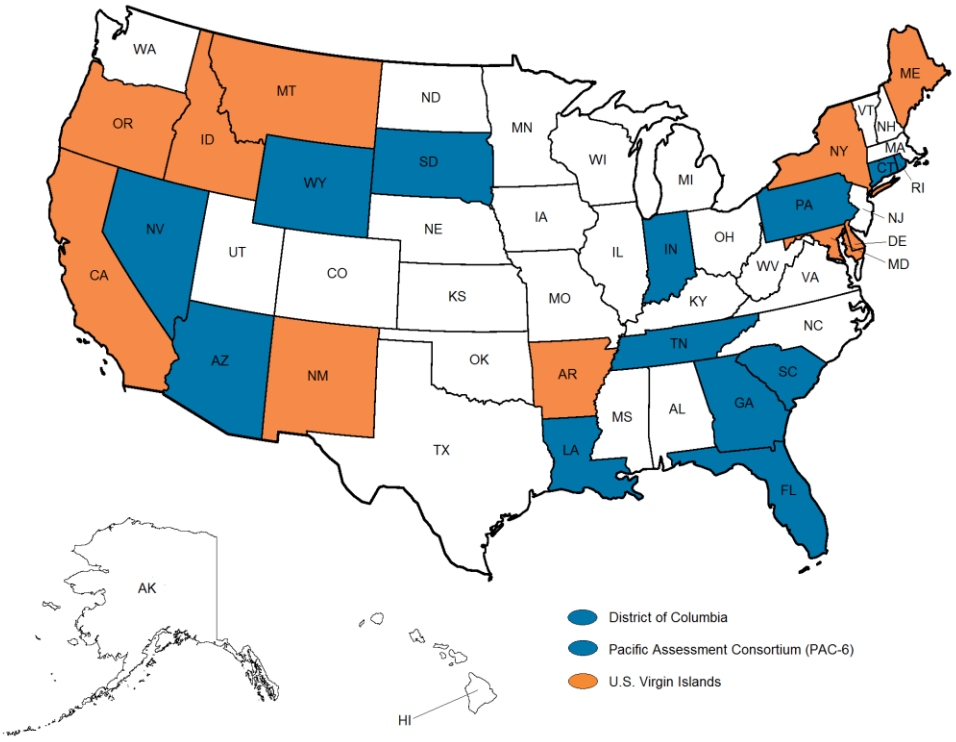
These materials and documents were developed under the National Center and State Collaborative (NCSC) General Supervision Enhancement Grant and are consistent with its goals and foundations. Any changes to these materials are to be consistent with their intended purpose and use as defined by NCSC.

This document is available in alternative formats upon request.

NCSC is a collaborative of 15 states and five organizations.

The states include (shown in blue on map): Arizona, Connecticut, District of Columbia, Florida, Georgia, Indiana, Louisiana, Nevada, 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.

[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).

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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View of Learning Targets and Families across Grades

Distribution of Instructional Families: Number Operations (Real Numbers)

(K-4) Elementary School Learning Targets	(5-8) Middle School Learning Targets	(9-12) High School Learning Targets
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*	***NO-1*** *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*	***NO-1*** *Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.*

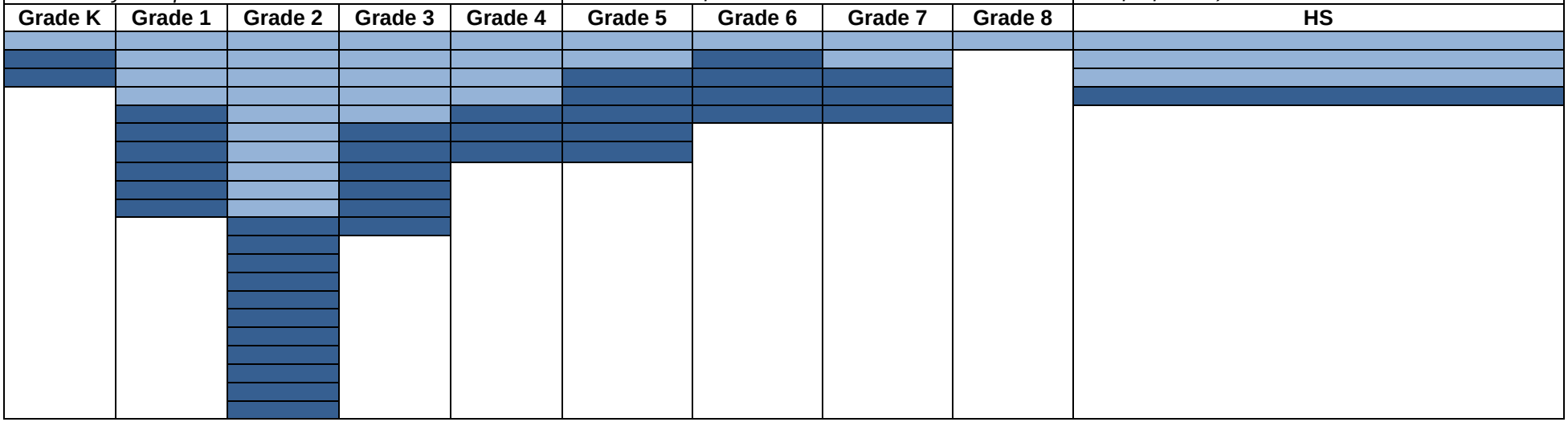
Grade K	Grade 1	Grade 2	Grade 3	Grade 4	Grade 6	Grade 7	Grade 8	HS

*** No CCCs at Grade 5**

Counting and Representing Numbers	Understanding the Base Ten Number System	Determining Relative Position of Numbers

Distribution of Instructional Families: Number Operations (Real Numbers)

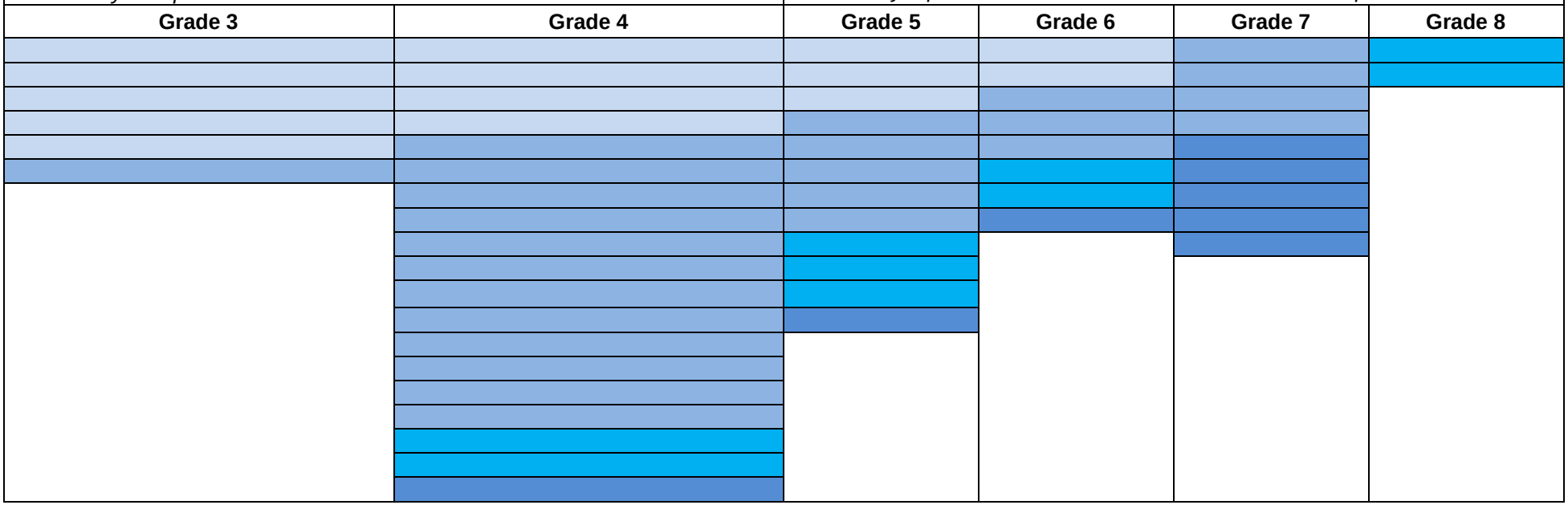
(K-4) Elementary School Learning Targets	(5-8) Middle School Learning Targets	(9-12) High School Learning Targets
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*	***NO-1*** *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*	***NO-1*** *Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.*
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*	***M.NO-2*** *Expand use of computational strategies and algorithms to rational numbers:* • *Perform operations fluently with rational numbers, including fractions, decimals, and percents;* • *Identify equivalence of indicated division and fractional parts.*	***H.NO-2*** *Build an understanding of computational strategies and algorithms including matrices and irrational and complex numbers:* • *Use matrix operations and complex and irrational number operations;* • *Apply exponential expressions (laws and properties).*



Perform Operations with Whole Numbers	Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Distribution of Instructional Families: Number Operations (Fractions/Ratios/Proportions)

(K-4) Elementary School Learning Targets	(5-8) Middle School Learning Targets
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*	***NO-1*** *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*	***M.NO-2*** *Expand use of computational strategies and algorithms to rational numbers:* • *Perform operations fluently with rational numbers, including fractions, decimals, and percents;* • *Identify equivalence of indicated division and fractional parts.*



*** No CCCs at K, 1, 2 or HS**

Representing	Performing Operations	Determining Equivalency	Problem Solving

View of Learning Targets, Families, and CCCs by Grade-band

Overview of CCCs: Number Operations (Real Numbers) - Counting and Representing Numbers; Understanding Base Ten Number System; Determining Relative Position of Whole Numbers

(K-4) Elementary School Learning Targets				
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*				
Grade K	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**
K.NO.1a1 Rote count up to 10 *K.CC.1*	1.NO.1a5 Rote count up to 31 *K.CC.1*	2.NO.1a9 Rote count up to 100 *K.CC.1*	3.NO.1j2 Write or select the expanded form for up to 3 digit number *2.NBT.3*	4.NO.1j5 Use place value to round to any place (i.e., ones, tens, hundreds, thousands) *4.NBT.3*
K.NO.1a2 Rote count up to 31 *K.CC.1*	1.NO.1a6 Rote count up to 100 *K.CC.1*	2.NO.1d5 Identify numerals 0-100 *2.NBT.3*		
K.NO.1a3 Rote count up to 100 *K.CC.1*	1.NO.1a7 Count forward beginning from any given number below 10 *K.CC.2*	2.NO.1d6 Identify the numeral between 0 and 100 when presented the name *2.NBT.3*	3.NO.1j1 Build representations of numbers using hundreds, tens and ones. *2.NBT.1*	4.NO.1j7 Write or select the expanded form for a multi-digit number *4.NBT.2*
K.NO.1a4 Count up to 10 objects in a line, rectangle, or array *K.CC.4*	1.NO.1d3 Identify numerals 0-31 *K.CC.3*	2.NO.1e3 Write or select the numerals 0-100 *2.NBT.3*	3.NO.1j3 Use place value to round to the nearest 10 or 100 *2.NBT.3*	
K.NO.1b1 Match the numeral to the number of objects in a set *K.CC.4*	1.NO.1d4 Identify the numeral up to 31 when presented the name *K.CC.3*	2.NO.1e7 Identify numbers as odd or even *2.OA.3*	3.NO.1h1 Compare 3 digit numbers using representations and numbers *2.NBT.4*	4.NO.1j6 Compare multi-digit numbers using representations and numbers *4.NBT.3*
K.NO.1d1 Identify numerals 1-10 *K.CC.3*	1.NO.1e2 Write or select the numerals 0-31 *K.CC.3*	2.NO.1i3 Explain what the zero represents in place value (hundreds, tens, ones) in a number. *2.NBT.3*		4.NO.1k1 Compare the value of a number when it is represented in different place values of two 3 digit numbers *4.NBT.1*

(K-4) Elementary School Learning Targets				
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*				
Grade K	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**
K.NO.1d2 Identify the numerals 1-10 when presented the name of the number *K.CC.3*	1.NO.1c1 Use a number line to count up to 31 objects by matching 1 object per number *K.CC.4*	2.NO.1h5 Build representations of 3 digit numbers using hundreds, tens and ones. *1.NBT.2b* *2.NBT.1*		
K.NO.1e1 Write or select the numerals 1-10 *K.CC.3*	1.NO.1a7 Count forward beginning from any given number below 10 *K.CC.2*	2.NO.1h8 Write or select expanded form for any 2 digit number *2.NBT.3*		
K.NO.1a4 Count up to 10 objects in a line, rectangle, or array *K.CC.4*	1.NO.1h2 Identify the value of the numbers in the tens and ones place within a given number up to 31 *1.NBT.2*	2.NO.1h9 Write or select expanded form for any 3 digit number *2.NBT.3*		
K.NO.1b2 Identify the set that has more *K.CC.4*	1.NO.1h1 Build representations of numbers up to 19 by creating a group of 10 and some 1s *K.NBT.1*	2.NO.1i3 Explain what the zero represents in place value (hundreds, tens, ones) in a number. *2.NBT.3*		
K.NO.1f1 Identify the smaller or larger number given 2 numbers between 0-10 *K.CC.7*	1.NO.1i1 Recognize zero as representing none or no objects *K.CC.3*	2.NO.1f6 Compare (greater than, less than, equal to) 2 numbers up to 100 *2.NBT.4*		
	1.NO.1i2 Recognize zero as an additive identity *1.OA.3*			

(K-4) Elementary School Learning Targets				
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*				
Grade K	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**
	1.NO.1a8 Count up to 31 objects in a line, rectangle, or array *K.CC.4*	2.NO.1h6 Compare 2 digit numbers using representations and numbers *1.NBT.3*		
	1.NO.1b3 Compare 2 sets and identify the set that is either greater than or less than the other set *K.CC.6*	2.NO.1h7 Compare 3 digit numbers using representations and numbers *2.NBT.4*		
	1.NO.1f2 Order up to 3 sets with up to 10 objects in each set *K.CC.6*			
	1.NO.1f3 Order up to 3 sets with up to 20 objects in each set *K.CC.6*	2.SE.1c1 Compare sets and use appropriate symbol to label the first as =, <, or > the second set *K.CC.6*		
	1.NO.1f4 Order up to 3 numbers up to 31 *K.CC.6*			
	1.NO.1f5 Identify the smaller or larger number given 2 numbers between 0-31 *K.CC.7*			
	1.NO.1h3 Compare two digit numbers up to 31 using representations and numbers (e.g., identify more tens, less			

(K-4) Elementary School Learning Targets				
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*				
Grade K	**Grade 1**	**Grade 2**	**Grade 3**	**Grade 4**
	tens, more ones, less ones, larger number, smaller number) *1.NBT.3*			

Counting and Representing Numbers	Understanding the Base Ten Number System	Determining Relative Position of Numbers

Overview of CCCs: Number Operations (Real Numbers) - Counting and Representing Numbers; Understanding Base Ten Number System; Determining Relative Position of Whole Numbers

(5-8) Middle School Learning Targets	
NO-1 *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*	
Grade 6	**Grades 7- 8**
6.NO.1e1 Determine the meaning of absolute value *6.NS.7c*	8.NO.1k1 Identify π as an irrational number *8.NS.1*
6.NO.1i1 Identify what an exponent represents (e.g., 8^3= 8X8X8) *5.NBT.2* *6.EE.1*	8.NO.1k2 Round irrational numbers to the hundredths place *8.NS.1*
	8.NO.1i1 Convert a number expressed in scientific notation up to 10,000 *8.EE.3*
6.NO.1d1 Identify numbers as positive or negative *6.NS.6*	7.NO.1g2 Identify the difference between two given numbers on a number line using absolute value *7.NS.1c*
6.NO.1d2 Locate positive and negative numbers on a number line *6.NS.6*	8.NO.1k3 Use approximations of irrational numbers to locate them on a number line *8.NS.2*
6.NO.1d3 Plot positive and negative numbers on a number line *6.NS.6*	
6.NO.1d4 Select the appopriate meaning of a negative number in a real world situation *6.NS.5*	
6.NO.1d5 Find given points between -10 and 10 on both axis of a coordinate plane *6.NS.6c*	
6.NO.1d6 Label points between -10 and 10 on both axis of a coordinate plane *6.NS.6c*	

(5-8) Middle School Learning Targets	
NO-1 *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*	
Grade 6	**Grades 7- 8**
6.NO.2e2 Compare two numbers on a number line (e.g., -2 > -9) *6.NS.7a*	

Understanding the Base Ten Number System	**Determining Relative Position of Numbers**

<u>Overview of CCCs</u>: Number Operations (Real Numbers) - Counting and Representing Numbers; Understanding Base Ten Number System; Determining Relative Position of Whole Numbers

(9-12) High School Learning Targets
NO-1 *Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.*
HS
HS.NO1a3 Convert a number expressed in scientific notation *N.RN.2*
HS.NO.1a2 Explain the influence of an exponent on the location of a decimal point in a given number *N.RN.2*

Understanding the Base Ten Number System

Overview of CCCs: Number Operations (Real Numbers) - Perform Operations with Whole Numbers; Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

<table>
<tr><th colspan="4">(K-4) Elementary School Learning Targets</th></tr>
<tr><td colspan="4">NO-1 Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:
• Count, model, and estimate quantities;
• Compare, represent, and order numbers;
• Apply place value concepts and expanded notation to compose and decompose whole numbers.</td></tr>
<tr><td colspan="4">E.NO-2 Build an understanding of computational strategies and algorithms:
• Fluently add, subtract, multiply, divide, and estimate;
• Perform and represent operations with whole numbers, fractions, and mixed numbers;
• Identify multiples and factors of whole numbers.</td></tr>
<tr><th>Grade K-1</th><th>Grade 2</th><th>Grade 3</th><th>Grade 4</th></tr>
<tr><td>K.NO.2a1 Count 2 sets to find sums up to 10
K.OA.2</td><td>2.NO.1e4 Skip count by 5s
2.NBT.2</td><td rowspan="2">3.NO.1e1 Skip count by 100s
2.NBT.2</td><td rowspan="2">4.NO.2c2 Solve multi digit addition and subtraction problems up to 1000
3.NBT.2</td></tr>
<tr><td>1.NO.2a5 Count 2 sets to find sums up to 10
K.OA.2</td><td>2.NO.1e5 Skip count by 10s
2.NBT.2</td></tr>
<tr><td>1.NO.2a6 Count 2 sets to find sums up to 20
1.OA.6</td><td>2.NO.1e6 Skip count by 100s
2.NBT.2</td><td rowspan="3">3.NO.1e2 Mentally add or subtract 100 from a given set from the 100s family (e.g., what is 100 more than 500? What is 100 less than 700?)
2.NBT.8</td><td rowspan="3">4.NO.2f1 Identify multiples for a whole number (e.g., 2= 2, 4, 6, 8, 10).
4.OA.4
4.OA.5</td></tr>
<tr><td rowspan="2">1.NO.2a4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record or select the answer
K.OA.4</td><td>2.NO.1e8 Mentally add or subtract 10 from a given set from the 10s family (e.g., what is 10 more than 50? What is 10 less than 70?)
2.NBT.8</td></tr>
<tr><td>2.NO.1e9 Mentally add or subtract 100 from a given set from the 100s family (e.g., what is 100 more than 500? What is 100 less than 700?)
2.NBT.8</td></tr>
</table>

(K-4) Elementary School Learning Targets			
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*			
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*			
Grade K-1	**Grade 2**	**Grade 3**	**Grade 4**
1.NO.2a5 Count 2 sets to find sums up to 10 *K.OA.2*	2.NO.2a15 Remove objects from a set in a subtraction situation to find the amount remaining up to 20 *1.OA.1*	3.NO.2b1 Use the relationships between addition and subtraction to solve problems *3.NBT.2*	4.NO.2f2 Solve multiplication problems up to two digits by one digit *4.NBT.5*
K.NO.2a2 Decompose a set of up to 10 objects into a group; count the quantity in each group *K.OA.3*	2.NO.2a19 Combine up to 3 sets of 20 or less *2.NBT.6*	3.NO.2c1 Solve multi-step addition and subtraction problems up to 100 *3.NBT.2*	4.PRF.1f4 Solve a 2-digit by 1-digit multiplication problem using 2 different strategies *4.NBT.5*
	2.NO.2b1 Use commutative properties to solve addition problems with sums up to 20 (e.g., 3+8=11 therefore 8+3=__) *1.OA.3*	3.NO.2d3 Solve multiplication problems with neither number greater than 5. *3.OA.1*	
K.NO.2a3 Solve word problems within 10 *K.OA.2*	2.NO.2a18 Use diagrams and number lines to solve addition or subtraction problems *2.NBT.7*	3.NO.2d1 Find the total number of objects when given the number of identical groups and the number of objects in each group neither number larger than 5 *2.OA.4* *3.OA.1*	4.NO.2d7 Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 10 *3.OA.2*
	2.NO.2b2 Use associative property to solve addition problems with sums up to 20 *1.OA.3*		
1.NO.2a7 Decompose a set of up to 10 objects into a group; count the quantity in each group *K.OA.3*	2.NO.2c3 Compose ones into tens and/or tens into hundreds in addition situation *1.NBT.4* *2.NBT.7*	3.NO.2d2 Find total number inside an array with neither number in the columns or rows larger than 5 *2.OA.4* *3.OA.1*	4.NO.2d8 Match an accurate addition and multiplication equation to a representation *3.OA.1*

<table>
<tr><th colspan="4">(K-4) Elementary School Learning Targets</th></tr>
<tr><td colspan="4">NO-1 Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:
• Count, model, and estimate quantities;
• Compare, represent, and order numbers;
• Apply place value concepts and expanded notation to compose and decompose whole numbers.</td></tr>
<tr><td colspan="4">E.NO-2 Build an understanding of computational strategies and algorithms:
• Fluently add, subtract, multiply, divide, and estimate;
• Perform and represent operations with whole numbers, fractions, and mixed numbers;
• Identify multiples and factors of whole numbers.</td></tr>
<tr><th>Grade K-1</th><th>Grade 2</th><th>Grade 3</th><th>Grade 4</th></tr>
<tr><td rowspan="2">1.NO.2a8 Decompose a set of up to 20 objects into a group; count the quantity in each group
1.OA.6</td><td>2.NO.2c4 Decompose tens into ones and/or hundreds into tens in subtraction situations
1.NBT.6
2.NBT.7</td><td rowspan="2">3.NO.2d4 Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 5
3.OA.2</td><td rowspan="2">4.NO.2e2 Solve or solve and check one or two step word problems requiring addition, subtraction or multiplication with answers up to 100
4.OA.3</td></tr>
<tr><td>2.NO.2a12 Model addition and subtraction with base 10 blocks within 20
2.NBT.5</td></tr>
<tr><td rowspan="3">1.NO.2a9 Use manipulatives or representations to write simple addition or subtraction equations within 20 based upon a word problem
1.OA.1</td><td>2.NO.2a13 Model addition and subtraction with base 10 blocks within 50
2.NBT.5</td><td rowspan="3">3.NO.2d5 Determine the number of groups given the number of total number of objects and the number of objects in each group where the number in each group and the number of groups is not greater than 5
3.OA.2</td><td rowspan="3"></td></tr>
<tr><td>2.NO.2a14 Model addition and subtraction with base 10 blocks within 100
2.NBT.5</td></tr>
<tr><td>2.NO.2a16 Solve word problems within 20
2.OA.1</td></tr>
<tr><td>1.NO.2a10 Use data presented in graphs (i.e., pictoral, object) to solve one step “how many more” or “how many less” word problems
1.OA.1</td><td>2.NO.2a17 Solve word problems within 100
2.OA.1</td><td>3.NO.2e1 Solve or solve and check one or two step word problems requiring addition, subtraction or multiplication with answers up to 100
3.OA.8</td><td></td></tr>
</table>

(K-4) Elementary School Learning Targets			
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*			
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*			
Grade K-1	**Grade 2**	**Grade 3**	**Grade 4**
	2.NO.2c2 Identify and apply addition, subtraction, and equal signs *1.OA.7*		
1.NO.2a11 Solve word problems within 20 *1.OA.1*	2.SE.1c2 Label simple equations as = or the phrase not equal *1.OA.7*	3.NO.1j4 Use rounding to solve word problems *3.NBT.1*	
1.NO.2c1 Identify and apply addition and equal signs *1.OA.7*	2.SE.1d1 Represent addition of 2 sets when shown the + symbol *2.OA.1*		
	2.SE.1d2 Represent a "taking away" situation with the – symbol *1.OA.8*		

Perform Operations with Whole Numbers	**Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers**

Overview of CCCs: Number Operations (Real Numbers) - Perform Operations with Whole Numbers; Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

(5-8) Middle School Learning Targets			
NO-1 *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*			
M.NO-2 *Expand use of computational strategies and algorithms to rational numbers:* • *Perform operations fluently with rational numbers, including fractions, decimals, and percents;* • *Identify equivalence of indicated division and fractional parts.*			
Grade 5	**Grade 6**	**Grade 7**	**Grade 8**
5.NO.2a3 Find whole number quotients up to two dividends and two divisors *5.NBT.6*	6.NO.2e1 Determine the difference between two integers using a number line *6.NS.6a*	7.NO.2i1 Solve multiplication problems with positive/negative numbers *7.NS.2*	
5.NO.2a4 Find whole number quotients up to four dividends and two divisors *5.NBT.6*	6.NO.1i2 Solve numerical expressions involving whole number exponents *6.EE.1*	7.NO.2i2 Solve division problems with positive/negative numbers *7.NS.2*	
5.NO.2a1 Solve problems or word problems using up to three digit numbers and addition or subtraction *4.OA.3*	6.NO.2a6 Solve problems or word problems using up to three digit numbers and any of the four operations *6.EE.7*	7.NO.1g1 Identify the additive inverse of a number (e.g., -3 and +3) *7.NS.1b* *7.NS.1c*	
5.NO.2a2 Separate a group of objects into equal sets when given the number of sets to find the total in each set with the total number less than 50 *4.NBT.6*	6.SE.1a2 Given a real world problem, write an equation using 1 set of parentheses *6.EE.2c* *6.EE.6*	7.SE.1f1 Set up equations with 1 variable based on real world problems *7.EE.4*	
5.SE.1b1 Evaluate whether or not both sides of an equation are equal *6.EE.4*	6.SE.1a3 Write expressions for real-world problems involving one unknown number. *No CCSS linked*	7.SE.1f2 Solve equations with 1 variable based on real world problems *7.EE.4*	

(5-8) Middle School Learning Targets			
NO-1 *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*			
M.NO-2 *Expand use of computational strategies and algorithms to rational numbers:* • *Perform operations fluently with rational numbers, including fractions, decimals, and percents;* • *Identify equivalence of indicated division and fractional parts.*			
Grade 5	**Grade 6**	**Grade 7**	**Grade 8**
5.NO.2a5 Solve word problems that require multiplication or division *5.NBT.6*			
5.SE.1a1 Given a real world problem, write an equation using 1 set of parentheses *5.OA.1*			

Perform Operations with Whole Numbers	**Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers**

<u>Overview of CCCs</u>: Number Operations (Real Numbers) - Perform Operations with Whole Numbers; Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

(9-12) High School Learning Targets
NO-1 *Demonstrate flexibility using rational and irrational numbers and number systems, including complex numbers and matrices.*
H.NO-2 *Build an understanding of computational strategies and algorithms including matrices and irrational and complex numbers:* • *Use matrix operations and complex and irrational number operations;* • *Apply exponential expressions (laws and properties).*
HS
HS.NO.1a1 Simplify expressions that include exponents *N.RN.2* *A.SSE.3*
H.NO.2c2 Rewrite expressions that include rational exponents *N.RN.2* *A.SSE.2*
H.NO.2a1 Solve simple equations using rational numbers with one or more variables *A.REI.2*
H.NO.2b1 Explain the pattern for the sum or product for combinations of rational and irrational numbers *N.RN.3*

Perform Operations with Whole Numbers	Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers

Overview of CCCs: Number Operations (Fractions/Ratios/Proportions) - Representation; Determine Equivalency; Perform Operations and; Problem Solving

(K-4) Elementary School Learning Targets	
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*	
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*	
Grade 3	**Grade 4**
3.NO.1l1 Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles) *3.NF.1*	4.NO.1n1 Select a model of a given fraction (halves, thirds, fourths, sixths, eights) *3.NF.1*
	4.NO.1p1 Read, write or select decimals to the tenths place *4.NF.6*
3.NO.1l2 Identify the total number of parts (denominator) of a given representation (rectangles and circles) *3.NF.1*	4.NO.1p2 Read, write or select decimals to the hundredths place *4.NF.6*
	4.SE.1h1 Express whole numbers as fractions *3.NF.3c*
3.NO.1l3 Identify the fraction that matches the representation (rectangles and circles; halves, fourths, thirds, eighths) *3.NF.1*	4.NO.1l6 Locate fractions on a number line *3.NF.2*
	4.NO.1l7 Order fractions on a number line *3.NF.2*
3.NO.1l4 Identify that a part of a rectangle can be represented as a fraction that has a value between 0 and 1. *3.NF.2a*	4.NO.1m1 Determine equivalent fractions *3. NF.3*
	4.NO.1n2 Compare up to 2 given fractions that have different denominators *4.NF.2*
3.NO.1l5 Locate given common unit fractions (i.e., ½, ¼, 1/8,) on a number line or ruler 3.NF.2	4.SE.1g2 Use =, <, or > to compare 2 fractions (fractions with a denominator of 10 or less) *4.NF.2*

(K-4) Elementary School Learning Targets	
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*	
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*	
Grade 3	**Grade 4**
3.SE.1g1 Use =, <, or > to compare 2 fractions with the same numerator or denominator *3.NF.3d*	4.NO.1o1 Match a fraction with a denominator of 10 or 100 as a decimal (5/10 = .5) *4.NF.6*
	4.NO.1o2 Find equivalent decimal for a given fraction. *4.NF.5*
	4.SE.1h2 Identify the equivalent decimal for a fraction *4.NF6*
	4.NO.2g1 Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., ¾ = ¼ + ¼ + ¼) *3.NF.1* *4.NF.3 a, b*
	4.NO.1q1 Compare two decimals to the tenths place with a value of less than 1 *4.NF.7*
	4.NO.1q2 Compare two decimals to the hundredths place with a value of less than 1 *4.NF.7*
	4.SE.1g3 Use =, <, or > to compare 2 decimals (decimals in multiples of .10) *4.NF.7*
	4.NO.2h1 Add and subtract fractions with like denominators of (2,3,4, or 8) *4.NF.3 a, b*
	4.NO.2h2 Add and subtract fractions with like denominators (2,3,4, or 8) using representations *4.NF.3 a, b*

(K-4) Elementary School Learning Targets	
NO-1 *Build flexibility using whole numbers, fractions, and decimals to understand the nature of number and number systems:* • *Count, model, and estimate quantities;* • *Compare, represent, and order numbers;* • *Apply place value concepts and expanded notation to compose and decompose whole numbers.*	
E.NO-2 *Build an understanding of computational strategies and algorithms:* • *Fluently add, subtract, multiply, divide, and estimate;* • *Perform and represent operations with whole numbers, fractions, and mixed numbers;* • *Identify multiples and factors of whole numbers.*	
Grade 3	**Grade 4**
	4.NO.2h3 Solve word problems involving addition and subtraction of fractions with like denominators (2, 3, 4, or 8) *3.NF.3d*

Representing	**Performing Operations**	**Determining Equivalency**	**Problem Solving**

Overview of CCCs: Number Operations (Fractions/Ratios/Proportions) - Representation; Determine Equivalency; Perform Operations and; Problem Solving

(5-8) Middle School Learning Targets			
NO-1 *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*			
M.NO-2 *Expand use of computational strategies and algorithms to rational numbers:* • *Perform operations fluently with rational numbers, including fractions, decimals, and percents;* • *Identify equivalence of indicated division and fractional parts.*			
Grade 5	**Grade 6**	**Grade 7**	**Grade 8**
5.NO.1b6 Round decimals to the hundredths place *5.NBT.4*	6.NO.1f1 Find a percent of a quantity as rate per 100 *6.RP.3c*	7.NO.1h1 Identify an equivalent fraction, decimal and percent when given one of the three numbers *6.RP.3d*	8.NO.2i3 Solve one step addition, subtraction, multiplication, division problems with fractions, decimals, and positive/negative numbers *7.NS.1d*
5.NO.1b1 Read, write, or select a decimal to the hundredths place *5.NBT.3a*	6.NO.1f2 Write or select a ratio to match a given statement and representation *6.RP.1*		
5.NO.1b2 Read, write or select a decimal to the thousandths place *5.NBT.3a*	6.NO.1f2 Write or select a ratio to match a given statement and representation *6.RP.1*	7.NO.2f1 Identify the proportional relationship between two quantities *7.RP.2*	8.NO.2i4 Solve two step addition, subtraction, multiplication, and division problems with fractions, decimals, or positive/negative numbers *7.NS.1d*
5.NO.1b3 Compare two decimals to the thousandths place with a value of less than 1 *5.NBT.3a*	6.NO.1f3 Select or make a statement to interpret a given ratio *6.RP.1*		
5.NO.1c1 Rewrite a fraction as a decimal *4.NF.6*	6.NO.1f4 Find a missing value (representations, whole numbers, common fractions, decimals to hundredths place, percent) for a given ratio *6.RP.3a*	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 *7.RP.2*	
5.NO.1c2 Rewrite a decimal as a fraction *4.NF.6*			

(5-8) Middle School Learning Targets			
NO-1 *Build flexibility using rational and irrational numbers to expand understanding of number systems:* • *Estimate, compare, and represent numbers (fractions, decimals, and percents; integers);* • *Use exponents to express quantities and relationships;* • *Use integers in problem solving.*			
M.NO-2 *Expand use of computational strategies and algorithms to rational numbers:* • *Perform operations fluently with rational numbers, including fractions, decimals, and percents;* • *Identify equivalence of indicated division and fractional parts.*			
Grade 5	**Grade 6**	**Grade 7**	**Grade 8**
5.NO.1b4 Round decimals to the next whole number *5.NBT.4*	6.NO.1f5 Solve unit rate problems involving unit pricing *6.RP.3b*		
5.NO.1b5 Round decimals to the tenths place *5.NBT.4*	6.NO.2c3 Solve one step, addition, subtraction, multiplcation, or division problems with fractions or decimals *6.NS.1*	7.NO.2f3 Find unit rates given a ratio. *7.RP.1*	
5.NO.2b1 Add and subtract fractions with unlike denominators by replacing fractions with equivalent fractions (identical denominators) *5.NF.1*	6.NO.2c4 Solve word problems involving the addition, subtraction, multiplication or division of fractions *5.NF.7c*	7.NO.2f5 Use proportions to solve ratio problems *7.RP.3*	
5.NO.2b3 Multiply or divide fractions *5.NF.4*		7.NO.2f6 Solve word problems involving ratios *7.RP.3*	
5.NO.2c1 Solve 1 step problems using decimals *5.NBT.7*		7.NO.2.h1 Find percents in real world context *7.RP.3*	
5.NO.2c2 Solve word problems involving the addition, subtraction, multiplication or division of fractions *5.NF.2*		7.NO.2h2 Solve one step percentage increase and decrease problems *7.RP.3*	

Representing	**Performing Operations**	**Determining Equivalency**	**Problem Solving**

View by Instructional Families and CCSS Domains

Instructional Family: Number Operations (Real Numbers)

CCSS Domain Names: Counting and Cardinality; and Number and Operations in Base Ten		
Counting and Representing Numbers		
Grade K	**Grade 1**	**Grade 2**
K.NO.1a1 Rote count up to 10 *K.CC.1*	1.NO.1a5 Rote count up to 31 *K.CC.1*	2.NO.1a9 Rote count up to 100 *K.CC.1*
K.NO.1a2 Rote count up to 31 *K.CC.1*	1.NO.1a6 Rote count up to 100 *K.CC.1*	2.NO.1d5 Identify numerals 0-100 *2.NBT.3*
K.NO.1a3 Rote count up to 100 *K.CC.1*	1.NO.1a7 Count forward beginning from any given number below 10 *K.CC.2*	2.NO.1d6 Identify the numeral between 0 and 100 when presented the name *2.NBT.3*
K.NO.1a4 Count up to 10 objects in a line, rectangle, or array *K.CC.4*		2.NO.1e3 Write or select the numerals 0-100 *2.NBT.3*
K.NO.1b1 Match the numeral to the number of objects in a set K.CC.4	1.NO.1d3 Identify numerals 0-31 *K.CC.3*	2.NO.1e7 Identify numbers as odd or even *2.OA.3*
K.NO.1d1 Identify numerals 1-10 *K.CC.3*	1.NO.1d4 Identify the numeral up to 31 when presented the name *K.CC.3*	
K.NO.1d2 Identify the numerals 1-10 when presented the name of the number *K.CC.3*	1.NO.1e2 Write or select the numerals 0-31 *K.CC.3*	
K.NO.1e1 Write or select the numerals 1-10 *K.CC.3*	1.NO.1c1 Use a number line to count up to 31 objects by matching 1 object per number *K.CC.4*	

Instructional Family: Number Operations (Real Numbers)

CCSS Domain Names: Counting and Cardinality; Number Operations in Base Ten; The Number System; and The Real Number System				
Understanding Base Ten Number System				
Grades 1-2	**Grades 3-4**	**Grades 5-6**	**Grades 7-8**	**HS**
1.NO.1h2 Identify the value of the numbers in the tens and ones place within a given number up to 31 *1.NBT.2*	3.NO.1j2 Write or select the expanded form for up to 3 digit number *2.NBT.3*	6.NO.1e1 Determine the meaning of absolute value *6.NS.7c*	8.NO.1k1 Identify π as an irrational number (e.g., not necessary for counting, computation, etc.) *8.NS.1*	H.NO1a3 Convert a number expressed in scientific notation *N.RN.2*
1.NO.1h1 Build representations of numbers up to 19 by creating a group of 10 and some 1s (e.g., 13 = one 10 and three 1s) *K.NBT.1*	3.NO.1j1 Build representations of numbers using hundreds, tens and ones *2.NBT.1*	6.NO.1i1 Identify what an exponent represents (e.g., 8^3= 8X8X8) *5.NBT.2* *6.EE.1*	8.NO.1k2 Round irrational numbers to the hundredths place *8.NS.1*	H.NO.1a2 Explain the influence of an exponent on the location of a decimal point in a given number *N.RN.2*
1.NO.1i1 Recognize zero as representing none or no objects *K.CC.3*				
1.NO.1i2 Recognize zero as an additive identity *1.OA.3*	3.NO.1j3 Use place value to round to the nearest 10 or 100 *2.NBT.3*		8.NO.1i1 Convert a number expressed in scientific notation up to 10,000 *8.EE.3*	
2.NO.1i3 Explain what the zero represents in place value (hundreds, tens, ones) in a number. *2.NBT.3*				
2.NO.1h5 Build representations of 3 digit numbers using hundreds, tens and ones *2.NBT.1*	4.NO.1j7 Write or select the expanded form for a multi-digit number *4.NBT.2*			
2.NO.1h8 Write or select expanded form for any 2 digit number *2.NBT.3*	4.NO.1j5 Use place value to round to any place (i.e., ones, tens, hundreds, thousands) *4.NBT.3*			

CCSS Domain Names: Counting and Cardinality; Number Operations in Base Ten; The Number System; and The Real Number System				
Understanding Base Ten Number System				
Grades 1-2	**Grades 3-4**	**Grades 5-6**	**Grades 7-8**	**HS**
2.NO.1h9 Write or select expanded form for any 3 digit number *2.NBT.3*				

Instructional Family CCCs: Number Operations (Real Numbers)

<table>
<tr><td colspan="5">CCSS Domain Names: Counting and Cardinality; Number, Operations in Base Ten; and The Number System</td></tr>
<tr><td colspan="5">Determining Relative Position of Whole Numbers</td></tr>
<tr><th>Grade K</th><th>Grades 1-2</th><th>Grades 3-4</th><th>Grades 5-6</th><th>Grades 7-8</th></tr>
<tr><td rowspan="2">K.NO.1a4 Count up to 10 objects in a line, rectangle, or array
K.CC.4</td><td>1.NO.1a8 Count up to 31 objects in a line, rectangle, or array
K.CC.4</td><td rowspan="2">3.NO.1h1 Compare 3 digit numbers using representations and numbers (e.g., identify more hundreds, less hundreds, more tens, less tens, more ones, less ones, larger number, smaller number)
2.NBT.4</td><td rowspan="2">6.NO.1d1 Identify numbers as positive or negative
6.NS.6</td><td rowspan="2">7.NO.1g2 Identify the difference between two given numbers on a number line using absolute value
7.NS.1c</td></tr>
<tr><td>1.NO.1b3 Compare 2 sets and identify the set that is either greater than or less than the other set
K.CC.6</td></tr>
<tr><td rowspan="5">K.NO.1b2 Identify the set that has more
K.CC.4</td><td>1.NO.1f2 Order up to 3 sets with up to 10 objects in each set
K.CC.6</td><td rowspan="5">4.NO.1j6 Compare multi-digit numbers using representations and numbers
4.NBT.2</td><td rowspan="3">6.NO.1d2 Locate positive and negative numbers on a number line</td><td rowspan="5">8.NO.1k3 Use approximations of irrational numbers to locate them on a number line
8.NS.2</td></tr>
<tr><td>1.NO.1f3 Order up to 3 sets with up to 20 objects in each set
K.CC.6</td></tr>
<tr><td>1.NO.1f4 Order up to 3 numbers up to 31
K.CC.6</td></tr>
<tr><td>1.NO.1f5 Identify the smaller or larger number given 2 numbers between 0-31
K.CC.7</td><td rowspan="2">6.NO.1d3 Plot positive and negative numbers on a number line
6.NS.6</td></tr>
<tr><td></td></tr>
</table>

CCSS Domain Names: Counting and Cardinality; Number, Operations in Base Ten; and The Number System				
Determining Relative Position of Whole Numbers				
Grade K	**Grades 1-2**	**Grades 3-4**	**Grades 5-6**	**Grades 7-8**
K.NO.1f1 Identify the smaller or larger number given 2 numbers between 0-10 *K.CC.7*	1.NO.1h3 Compare two digit numbers up to 31 using representations and numbers (e.g., identify more tens, less tens, more ones, less ones, larger number, smaller number) *1.NBT.3*	4.NO.1k1 Compare the value of a number when it is represented in different place values of two 3 digit numbers *4.NBT.1*	6.NO.1d4 Select the appropriate meaning of a negative number in a real world situation *6.NS.5*	
	2.NO.1f6 Compare (greater than, less than, equal to) 2 numbers up to 100 *2.NBT.4*			
	2.NO.1h6 Compare 2 digit numbers using representations and numbers (e.g., identify more tens, less tens, more ones, less ones, larger number, smaller number) *1.NBT.3*		6.NO.1d5 Find given points between -10 and 10 on both axis of a coordinate plane *6.NS.6c*	
	2.NO.1h7 Compare 3 digit numbers using representations and numbers (e.g., identify more hundreds, less hundreds, more tens, less tens, more ones, less ones, larger number, smaller number) *2.NBT.4*		6.NO.1d6 Label points between -10 and 10 on both axis of a coordinate plane *6.NS.6c*	
	2.SE.1c1 Compare sets and use appropriate symbol to label the first as =, <, or > the second set *K.CC.6*			

CCSS Domain Names: Counting and Cardinality; Number, Operations in Base Ten; and The Number System				
Determining Relative Position of Whole Numbers				
Grade K	**Grades 1-2**	**Grades 3-4**	**Grades 5-6**	**Grades 7-8**
			6.NO.2e2 Compare two numbers on a number line (e.g., -2 > -9) *6.NS.7a*	

Instructional Family: Number Operations (Real Numbers)

CCSS Domain Names: Counting and Cardinality and Number; Operations in Base Ten; The Number System; and The Real Number System					
Performing Operations with Whole Numbers					
Grade K -1	**Grade 2**	**Grade 3**	**Grades 4 - 5**	**Grades 6-8**	**HS**
K.NO.2a1 Count 2 sets to find sums up to 10 *K.OA.2*	2.NO.1e4 Skip count by 5s *2.NBT.2* 2.NO.1e5 Skip count by 10s *2.NBT.2* 2.NO.1e6 Skip count by 100s *2.NBT.2*	3.NO.1e1 Skip count by 100s *2.NBT.2*	4.NO.2c2 Solve multi digit addition and subtraction problems up to 1000 *3.NBT.2*	6.NO.2e1 Determine the difference between two integers using a number line *6.NS.6a*	HS.NO.1a1 Simplify expressions that include exponents *N.RN.2* *A.SSE.3*
1.NO.2a5 Count 2 sets to find sums up to 10 *K.OA.2*	2.NO.1e8 Mentally add or subtract 10 from a given set from the 10s family (e.g., what is 10 more than 50? What is 10 less than 70?) *2.NBT.8*	3.NO.1e2 Mentally add or subtract 100 from a given set from the 100s family (e.g., what is 100 more than 500? What is 100 less than 700?) *2.NBT.8*	4.NO.2f1 Identify multiples for a whole number (e.g., 2= 2, 4, 6, 8, 10). *4.OA.4* *4.OA.5*	7.NO.2i1 Solve multiplication problems with positive/negative numbers *7.NS.2*	H.NO.2c2 Rewrite expressions that include rational exponents *N.RN.2* *A.SSE.2*
1.NO.2a6 Count 2 sets to find sums up to 20 *1.OA.6*	2.NO.1e9 Mentally add or subtract 100 from a given set from the 100s family (e.g., what is 100 more than 500? What is	3.NO.2b1 Use the relationships between addition and subtraction to solve problems	4.NO.2f2 Solve multiplication problems up to two digits by one digit	7.NO.2i2 Solve division problems with positive/negative numbers	H.NO.2a Solve simple equations using rational numbers with one or more variables

CCSS Domain Names: Counting and Cardinality and Number; Operations in Base Ten; The Number System; and The Real Number System					
Performing Operations with Whole Numbers					
Grade K -1	**Grade 2**	**Grade 3**	**Grades 4 - 5**	**Grades 6-8**	**HS**
	100 less than 700?) *2.NBT.8*	*3.NBT.2*	*4.NBT.5*	*7.NS.2*	*A.REI.2*
	2.NO.2a19 Combine up to 3 sets of 20 or less *2.NBT.6*				
1.NO.2a4 For any number from 1 to 9, find the number that makes 10 when added to the given number, e.g., by using objects or drawings, and record or select the answer *K.OA.4*	2.NO.2a15 Remove objects from a set in a subtraction situation to find the amount remaining up to 20 *1.OA.1*	3.NO.2c1 Solve multi-step addition and subtraction problems up to 100 *3.NBT.2*	4.PRF.1f4 Solve a 2-digit by 1-digit multiplication problem using 2 different strategies *4.NBT.5*		
	2.NO.2a18 Use diagrams and number lines to solve addition or subtraction problems *2.NBT.7*	3.NO.2d3 Solve multiplication problems with neither number greater than 5 *3.OA.1*	5.NO.2a3 Find whole number quotients up to two dividends and two divisors *5.NBT.6*		
	2.NO.2b1 Use commutative properties to solve addition problems with sums up to 20 (e.g., 3+8=11 therefore 8+3=__) *1.OA.3*		5.NO.2a4 Find whole number quotients up to four dividends and two divisors *5.NBT.6*		
	2.NO.2b2 Use associative property to solve addition problems				

CCSS Domain Names: Counting and Cardinality and Number; Operations in Base Ten; The Number System; and The Real Number System					
Performing Operations with Whole Numbers					
Grade K -1	**Grade 2**	**Grade 3**	**Grades 4 - 5**	**Grades 6-8**	**HS**
	with sums up to 20 *1.OA.3*				

Instructional Family: Number Operations (Real Numbers)

CCSS Domain Names: Counting and Cardinality; Number, Operations in Base Ten; The Number System; and The Real Number System					
Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers					
Grade K -1	**Grade 2**	**Grade 3**	**Grades 4 - 5**	**Grades 6-8**	**HS**
K.NO.2a3 Solve word problems within 10 *K.OA.2*	2.NO.2a16 Solve word problems within 20 *2.OA.1*	3.NO.2e1 Solve or solve and check one or two step word problems requiring addition, subtraction or multiplication with answers up to 100 *3.OA.8*	4.NO.2e2 Solve or solve and check one or two step word problems requiring addition, subtraction or multiplication with answers up to 100 *4.OA.3*	6.NO.2a6 Solve problems or word problems using up to three digit numbers and any of the four operations *6.EE.7*	H.NO.2b1 Explain the pattern for the sum or product for combinations of rational and irrational numbers *N.RN.3*
1.NO.2a11 Solve word problems within 20 *1.OA.1*	2.NO.2a17 Solve word problems within 100 *2.OA.1*	3.NO.1j4 Use rounding to solve word problems *3.NBT.1*	5.NO.2a1 Solve problems or word problems using up to three digit numbers and addition or subtraction *4.OA.3*		
K.NO.2a2 Decompose a set of up to 10 objects into a group; count the quantity in each group *K.OA.3*	2.NO.2c3 Compose ones into tens and/or tens into hundreds in addition situation *1.NBT.4* *2.NBT.7*	3.NO.2d1 Find the total number of objects when given the number of identical groups and the number of objects in each group neither number larger than 5 *2.OA.4* *3.OA.1*	4.NO.2d7 Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 10 *3.OA.2*	6.NO.1i2 Solve numerical expressions involving whole number exponents *6.EE.1*	
1.NO.2a7 Decompose a set of up to 10 objects into a group; count the quantity in each group *K.OA.3*	2.NO.2c4 Decompose tens into ones and/or hundreds into tens in subtraction situations *1.NBT.6* *2.NBT.7*	3.NO.2d2 Find total number inside an array with neither number in the columns or rows larger than 5 *2.OA.4* *3.OA.1*	4.NO.2d8 Match an accurate addition and multiplication equation to a representation *3.OA.1*	7.NO.1g1 Identify the additive inverse of a number (e.g., -3 and +3) *7.NS.1b* *7.NS.1c*	

CCSS Domain Names: Counting and Cardinality; Number, Operations in Base Ten; The Number System; and The Real Number System					
Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers					
Grade K -1	**Grade 2**	**Grade 3**	**Grades 4 - 5**	**Grades 6-8**	**HS**
1.NO.2a8 Decompose a set of up to 20 objects into a group; count the quantity in each group *1.OA.6*					
1.NO.2a9 Use manipulatives or representations to write simple addition or subtraction equations within 20 based upon a word problem *1.OA.1*	2.NO.2a12 Model addition and subtraction with base 10 blocks within 20 *2.NBT.5* 2.NO.2a13 Model addition and subtraction with base 10 blocks within 50 *2.NBT.5*	3.NO.2d4 Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 5 *3.OA.2*	5.SE.1b1 Evaluate whether or not both sides of an equation are equal *6.EE.4*	6.SE.1a3 Write expressions for real-world problems involving one unknown number *No CCSS linked*	
1.NO.2a10 Use data presented in graphs (i.e., pictoral, object) to solve one step “how many more” or “how many less” word problems *1.OA.1*	2.NO.2a14 Model addition and subtraction with base 10 blocks within 100 *2.NBT.5*	3.NO.2d5 Determine the number of groups given the number of total number of objects and the number of objects in each group where the number in each group and the number of groups is not greater than 5 *3.OA.2*	5.SE.1a1 Given a real world problem, write an equation using 1 set of parentheses *5.OA.1* 5.NO.2a2 Separate a group of objects into equal sets when given the number of sets to find the total in each set with the total number less than 50 *4.NBT.6*	6.SE.1a2 Given a real world problem, write an equation using 1 set of parentheses *6.EE.2c* *6.EE.6*	

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Modeling/Symbolizing Operations (Problem Solving) with Whole Numbers					
Grade K -1	**Grade 2**	**Grade 3**	**Grades 4 - 5**	**Grades 6-8**	**HS**
1.NO.2c1 Identify and apply addition and equal signs *1.OA.7*	2.NO.2c2 Identify and apply addition, subtraction, and equal signs *1.OA.7*		5.NO.2a5 Solve word problems that require multiplication or division *5.NBT.6*	7.SE.1f1 Set up equations with 1 variable based on real world problems *7.EE.4*	
	2.SE.1c2 Label simple equations as = or the phrase not equal *1.OA.7*				
	2.SE.1d1 Represent addition of 2 sets when shown the + symbol *2.OA.1*			7.SE.1f2 Solve equations with 1 variable based on real world problems *7.EE.4*	
	2.SE.1d2 Represent a "taking away" situation with the – symbol *1.OA.8*				

Instructional Families: Number Operations (Fractions/Ratios/Proportions)

CCSS Domain Names: Number Operations – Fractions and Ratios and Proportional Relationships	**CCSS Domain Names:** Number Operations – Fractions and Ratios, Number Operations in Base Ten, The Number System and Proportional Relationships	**CCSS Domain Names:** Number Operations – Fractions and Ratios, The Number System and Proportional Relationships	**CCSS Domain Names:** Number Operations – Fractions and Ratios, The Number System and Proportional Relationships
Representating	**Determining Equivalency**	**Performing Operations**	**Problem Solving**
3.NO.1l1 Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles) *3.NF.1*	4.NO.1l6 Locate fractions on a number line *3.NF.2*	4.NO.2h1 Add and subtract fractions with like denominators of (2,3,4, or 8) *4.NF.3 a, b*	4.NO.2h3 Solve word problems involving addition and subtraction of fractions with like denominators (2, 3, 4, or 8) *3.NF.3d*
3.NO.1l2 Identify the total number of parts (denominator) of a given representation (rectangles and circles) *3.NF.1*	4.NO.1l7 Order fractions on a number line *3.NF.2*	4.NO.2h2 Add and subtract fractions with like denominators (2,3,4, or 8) using representations *4.NF.3 a, b*	5.NO.2c2 Solve word problems involving the addition, subtraction, multiplication or division of fractions *5.NF.2*
3.NO.1l3 Identify the fraction that matches the representation (rectangles and circles; halves, fourths, thirds, eighths) *3.NF.1*	4.NO.1m1 Determine equivalent fractions *3. NF.3*	5.NO.2b1 Add and subtract fractions with unlike denominators by replacing fractions with equivalent fractions (identical denominators) *5.NF.1*	6.NO.2c4 Solve word problems involving the addition, subtraction, multiplication or division of fractions *5.NF.7c*
3.NO.1l4 Identify that a part of a rectangle can be represented as a fraction that has a value between 0 and 1. *3.NF.2a*	4.NO.1n2 Compare up to 2 given fractions that have different denominators *4.NF.2*	5.NO.2b3 Multiply or divide fractions *5.NF.4*	7.NO.2f3 Find unit rates given a ratio. *7.RP.1*
3.NO.1l5 Locate given common unit fractions (i.e., ½, ¼, 1/8,) on a number line or ruler 3.NF.2	4.SE.1g2 Use =, <, or > to compare 2 fractions (fractions with a denominator or 10 or less) *4.NF.2*	5.NO.2c1 Solve 1 step problems using decimals *5.NBT.7*	7.NO.2f5 Use proportions to solve ratio problems *7.RP.3*

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Representating	**Determining Equivalency**	**Performing Operations**	**Problem Solving**
4.NO.1n1 Select a model of a given fraction (halves, thirds, fourths, sixths, eights)	4.NO.1o1 Match a fraction with a denominator of 10 or 100 as a decimal (5/10 = .5) *4.NF.6*	6.NO.1f5 Solve unit rate problems involving unit pricing *6.RP.3b*	7.NO.2f6 Solve word problems involving ratios *6.RP.3b* *7.RP.3*
4.NO.1p1 Read, write or select decimals to the tenths place *4.NF.6*	4.NO.1o2 Find equivalent decimal for a given fraction. *4.NF.5*	6.NO.2c3 Solve one step addition, subtraction, multiplcation, or division problems with fractions or decimals *6.NS.1*	7.NO.2.h1 Find percents in real world context *7.RP.3*
4.SE.1h1 Express whole numbers as fractions *3.NF.3c*	4.SE.1h2 Identify the equivalent decimal for a fraction *4.NF.6*	8.NO.2i3 Solve one step addition, subtraction, multiplication, division problems with fractions, decimals, and positive/negative numbers *7.NS.1d*	7.NO.2h2 Solve one step percentage increase and decrease problems *7.RP.3*
	4.NO.2g1 Using a representation, decompose a fraction into multiple copies of a unit fraction (e.g., ¾ = ¼ + ¼ + ¼) *3.NF.1* *4.NF.3 a, b*	8.NO.2i4 Solve two step addition, subtraction, multiplication, and division problems with fractions, decimals, or positive/negative numbers *7.NS.1d*	
4.NO.1p2 Read, write or select decimals to the hundredths place *4.NF.6*	4.NO.1q1 Compare two decimals to the tenths place with a value of less than 1 *4.NF.7*		
5.NO.1b6 Round decimals to the hundredths place *5.NBT.4*	4.NO.1q2 Compare two decimals to the hundredths place with a value of less than 1 *4.NF.7*		
5.NO.1b1 Read, write, or select a decimal to the hundredths place *5.NBT.3a*			

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Representating	**Determining Equivalency**	**Performing Operations**	**Problem Solving**
5.NO.1b2 Read, write or select a decimal to the thousandths place *5.NBT.3a*	4.SE.1g3 Use =, <, or > to compare 2 decimals (decimals in multiples of .10) *4.NF.7*		
	5.NO.1b3 Compare two decimals to the thousandths place with a value of less than 1 *5.NBT.3a*		
6.NO.1f1 Find a percent of a quantity as rate per 100. *6.RP.3c*	5.NO.1c1 Rewrite a fraction as a decimal *4.NF.6*		
6.NO.1f2 Write or select a ratio to match a given statement and representation *6.RP.1*	5.NO.1c2 Rewrite a decimal as a fraction *4.NF.6*		
	5.NO.1b4 Round decimals to the next whole number *5.NBT.4*		
	5.NO.1b5 Round decimals to the tenths place *5.NBT.4*		
	6.NO.1f2 Write or select a ratio to match a given statement and representation *6.RP.1*		
	6.NO.1f3 Select or make a statement to interpret a given ratio *6.RP.1*		

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Representating	**Determining Equivalency**	**Performing Operations**	**Problem Solving**
	6.NO.1f4 Find a missing value (representations, whole numbers, common fractions, decimals to hundredths place, percent) for a given ratio *6.RP.3a*		
	7.NO.1h1 Identify an equivalent fraction, decimal and percent when given one of the three numbers *6.RP.3d*		
	7.NO.2f1 Identify the proportional relationship between two quantities *7.RP.2*		
	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 *7.RP.2*		