Numbers and Operations 1

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(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

(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.

(9-12) High School Learning Targets

NO 1 Demonstrate flexibility using rational and irrational numbers and number systems including complex numbers and matrices

Grade Differentiation

Elementary School Progress Indicators

Progress Indicator E.NO.1a showing mastery of the prerequisite core skills of cardinality, constancy, and 1:1 correspondence
K.NO.1a1 Rote count to 10
Counting and Cardinality
K CC Know number names and the count sequence
K.CC.A.1 Count to 100 by ones and by tens

K.NO.1a2 Rote count to 31
Counting and Cardinality
K CC Know number names and the count sequence
K.CC.A.1 Count to 100 by ones and by tens

K.NO.1a3 Rote count to 100
Counting and Cardinality
K CC Know number names and the count sequence
K.CC.A.1 Count to 100 by ones and by tens

K.NO.1a4 Count up to 10 objects in a line, rectangle, or array
Counting and Cardinality
K CC Count to tell the number of objects
K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality
a) When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with tone and only one object
K.CC.B.5 Count to answer how many? questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects

Progress Indicator E NO 1b developing an understanding of number and principles of quantity (e.g., hold up 5 fingers at once to show 5, locate things in 2s without counting; using number words to indicate small exact numbers or relative change in quantity more, small)
K NO 1b1 Match the numeral to the number of objects in a set
Counting and Cardinality
K CC Count to tell the number of objects
K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality
a) When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with tone and only one object
K.CC.B.5 Count to answer how many? questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects

K.NO.1b2 Identify the set that has more
Counting and Cardinality
K CC Count to tell the number of objects
K.CC.B.4 Understand the relationship between numbers and quantities connect counting to cardinality
b) Understand that the last number name said tells the number of objects counted. The number of objects is the same regardless of their arrangement or the order in which they were counted

Progress Indicator: E NO 1d identifying numbers names symbols quantity) and the count sequence
K.NO.1d1 Identify numerals 1-10
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.3 Write numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects).

K.NO.1d2 Identify the numerals 1-10 when presented the name of the number
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.3 Write numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects).

Progress Indicator: E.NO.1e reading and writing numbers; counting and estimating (e.g., how many; skip counting by 2s, 5s, 10s; even/odd)
K.NO.1e1 Write or select the numerals 1-10
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.3 Write numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects).

Progress Indicator: NO.1f representing, ordering, and comparing whole numbers
K.NO.1f1 Identify the smaller or larger number given 2 numbers between 0-10
Counting and Cardinality
K CC Compare numbers.
K.CC.C.7 Compare two numbers between 1 and 10 presented as written numerals.

Progress Indicator: E.NO.1a showing mastery of the prerequisite core skills of cardinality, constancy, and 1:1 correspondence
1.NO.1a5 Rote count to 31
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.1 Count to 100 by ones and by tens.

1.NO.1a6 Rote count to 100
Counting and Cardinality
K CC Know number names and the count sequence.
1 NBT Extend the counting sequence.
K.CC.A.1 Count to 100 by ones and by tens.
1.NBT.A.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent several objects with a written numeral.

1.NO.1a7 Count forward beginning from any given number below 10
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.2 Count forward beginning from a given number within the known sequence (instead of having to begin at 1).

1.NO.1a8 Count up to 31 objects in a line, rectangle, or array
Counting and Cardinality
K CC Count to tell the number of objects.
K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.
a) When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with tone and only one object.
K.CC.B.5 Count to answer "how many?" questions about as many as 20 things arranged in a line, a rectangular array, or a circle, or as many as 10 things in a scattered configuration; given a number from 1-20, count out that many objects.

Progress Indicator: E.NO.1b developing an understanding of number and principles of quantity (e.g., hold up 5 fingers at once to show 5, locate things in 2s without counting; using number words to indicate small exact numbers or relative change in quantity - more, small)
1.NO.1b3 Compare 2 sets and identify the set that is either greater than or less than the other set
Counting and Cardinality
K CC Compare numbers.
K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

Progress Indicator: E.NO.1c developing number line skills (linear representations) using 0 to 20, and later 0 to 100
1.NO.1c1 Use a number line to count to 31 objects by matching 1 object per number
Counting and Cardinality
K CC Count to tell the number of objects.
K.CC.B.4 Understand the relationship between numbers and quantities; connect counting to cardinality.
a) When counting objects, say the number names in the standard order, pairing each object with one and only one number name and each number name with one and only one object.

Progress Indicator: E.NO.1d identifying numbers (names, symbols, quantity) and the count sequence
1.NO.1d3 Identify numerals 0-31
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.3 Written numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects.)

1.NO.1d4 Identify the numeral up to 31 when presented the name
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.3 Written numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects.)

Progress Indicator: E.NO.1e reading and writing numbers; counting and estimating (e.g., how many; skip counting by 2s, 5s, 10s; even/odd)
1.NO.1e2 Write or select the numerals 0-31
Counting and Cardinality
K CC Know number names and the count sequence.
K.CC.A.3 Written numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects.)

Progress Indicator: NO.1f representing, ordering, and comparing whole numbers
1.NO.1f2 Order up to 3 sets that have up to 10 objects in each set
Counting and Cardinality
K CC Compare numbers.
K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

1.NO.1f3 Order up to 3 sets with up to 20 objects in each set
Counting and Cardinality
K CC Compare numbers.
K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

1.NO.1f4 Order up to 3 numbers up to 31
Counting and Cardinality
K CC Compare numbers.
K.CC.C.6 Identify whether the number of objects in one group is greater than, less than, or equal to the number of objects in another group, e.g., by using matching and counting strategies.

1.NO.1f5 Identify the smaller or larger number given 2 numbers between 0-31
Counting and Cardinality
K CC Compare numbers.
K.CC.C.7 Compare two numbers between 1 and 10 presented as written numerals.

Progress Indicator: E.NO.1h applying place value understanding to compare and order numbers, express number relationships (<, >, =), and express numbers in expanded form
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)
Number and Operations in Base Ten
K NBT Work with numbers 11-19 to gain foundations for place value.
1 NBT Understand place value.
K.NBT.A.1 Compose and decompose numbers from 11 to 19 into tens ones and some further ones, e.g., by using objects or drawings, and record each composition or decomposition by a drawing or equation (e.g., 18 = 10 + 8); understand that these numbers are composed of ten ones and one, two, three, four, five, six, seven, eight, or nine ones.
1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
b) The numbers from 11 to 19 are composed of a ten and one, two, three four, five, six, seven, eight, or nine ones.

1.NO.1h2 Identify the value of the numbers in the tens and ones place within a given number up to 31
Number and Operations in Base Ten
1 NBT Understand place value.
1.NBT.B.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
a) 10 can be thought of as a bundle of ten ones – called a "ten".
b) The numbers from 11 to 19 are composed of a ten and one, two, three four, five, six seven, eight, or nine ones.

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)
Number and Operations in Base Ten
1 NBT Understand place value.
1.NBT.B.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, and <.

Progress Indicator: E.NO.1i recognizing zero as an additive identity, origin for the number line, and representing no units as a quantity or in place value
1.NO.1i1 Recognize zero as representing none or no objects
Counting and Cardinality
K CC Know number names and the counts sequence.
K.CC.A.3 Write numbers from 0 to 20. Represent several objects with a written numeral 0-20 (with 0 representing a count of no objects).
1.NO.1i2 Recognize zero as an additive identity
Operations and Algebraic Thinking
1 OA Understand and apply properties of operations and the relationship between addition and subtraction.
1.OA.B.3 Apply properties of operations as strategies to add and subtract. Examples: If 8 + 3 = 11 is known, then 3 + 8 = 11 is also known. (Commutative property of addition.) To add 2 + 6+ 4 = 2 + 10 = 12. (Associative property of addition.)

Progress Indicator: E.NO.1a showing mastery of the prerequisite core skills of cardinality, constancy, and 1:1 correspondence
2.NO.1a9 Rote count to 100
Counting and Cardinality
K CC Know number names and the counts sequence.
Number and Operations in Base Ten
1 NBT Extend the counting sequence.
K.CC.A.1 Count to 100 by ones and by tens.
1.NBT.A.1 Count to 120, starting at any number less than 120. In this range, read and write numerals and represent several objects with a written numeral.

Progress Indicator: E.NO.1d identifying numbers (names, symbols, quantity) and the count sequence
2.NO.1d5 Identify numerals 0-100
Number and Operations in Base Ten
2 NBT Understand place value.

2.NO.1d6 Identify the numeral between 0 and 100 when presented the name
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Progress Indicator: E.NO.1e reading and writing numbers; counting and estimating (e.g., how many; skip counting by 2s, 5s, 10s; even/odd)
2.NO.1e3 Write or select the numerals 0-100
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

2.NO.1e4 Skip count by 5s
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.2 Count within 1000: skip-count by 5s, 10s, and 100s.

2.NO.1e5 Skip count by 10s
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.2 Count within 1000: skip-count by 5s, 10s, and 100s.

2.NO.1e6 Skip count by 100s
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.B.2 Count within 1000: skip-count by 5s, 10s, and 100s.

2.NO.1e7 Identify numbers as odd or even
Operations and Algebraic Thinking
2 OA Work with equal groups of objects to gain foundation for multiplication.
2.OA.C.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.

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?) 1.NBT.C.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used
Number and Operations in Base Ten
2 NBT Use place value understanding and properties of operations to add and subtract.
2.NBT.B.8 Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number 100-900.

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?)
Number and Operations in Base Ten
2 NBT Use place value understanding and properties of operations to add and subtract.
2.NBT.B.8 Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number 100-900.

Progress Indicator: NO.1f representing, ordering, and comparing whole numbers
2.NO.1f6 Compare (greater than, less than, equal to) 2 numbers up to 100
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Progress Indicator: E.NO.1h applying place value understanding to compare and order numbers, express number relationships (<, >, =), and express numbers in expanded form
2.NO.1h4 Build representations of 3-digit numbers using tens and ones
Number and Operations in Base Ten
1.NBT; 2 NBT Understand place value.
1.NBT.B.2b Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:
b) The numbers from 11 to 19 are composed of a ten and one, two, three four, five, six, seven, eight, or nine ones.
2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones: e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
a) 100 can be thought of as a bundle of ten tens – called a "hundred."
b) The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

2.NO.1h5 Build representations of 3-digit numbers using hundreds, tens and ones
Number and Operations in Base Ten
2.NBT Understand place value.
2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones: e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
a) 100 can be thought of as a bundle of ten tens – called a "hundred."
b) The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

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)
Number and Operations in Base Ten
1NBT; 2.NBT Understand place value.
1.NBT.B.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the symbols >, =, <.
2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

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)
Number and Operations in Base Ten
1 NBT Understand place value.
2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

2.NO.1h8 Write or select expanded form for any 2-digit number
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

2.NO.1h9 Write or select expanded form for any 3-digit number
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Progress Indicator: E.NO.1i recognizing zero as an additive identity, origin for the number line, and representing no units as a quantity or in place value
2.NO.1i3 Explain what the zero represents in place value (hundreds, tens, ones) in a number
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

Progress Indicator: E.NO.1e reading and writing numbers; counting and estimating (e.g., how many; skip counting by 2s, 5s, 10s; even/odd)
3.NO.1e1 Skip count by 100s
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.2 Count within 1000: skip-count by 5s, 10s, and 100s.

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?)
Number and Operations in Base Ten
2 NBT Use place value understanding and properties of operations to add and subtract.
2.NBT.B.8 Mentally add 10 or 100 to a given number 100-900 and mentally subtract 10 or 100 from a given number 100 – 900.

Progress Indicator: E.NO.1h applying place value understanding to compare and order numbers, express number relationships (<, >, =), and express numbers in expanded form
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)
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.

Progress Indicator: E.NO.1j applying place value concepts to read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place
2.NO.1j1 Build representations of numbers using hundreds, tens and ones
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.1 Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones: e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
a) 100 can be thought of as a bundle of ten tens – called a "hundred."
b) The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).

3.NO.1j2 Write or select the expanded form for up to 3-digit number
Number and Operations in Base Ten
2 NBT Understand place value.
2.NBT.A.3 Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.

3.NO.1j3 Use place value to round to the nearest 10 or 100
Number and Operations in Base Ten
3 NBT Use place value understanding and properties of operations to perform multi-digit arithmetic.
3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

3.NO.1j4 Use rounding to solve word problems
Number and Operations in Base Ten
Use place value understanding and properties of operations to perform multi-digit arithmetic.
3.NBT.A.1 Use place value understanding to round whole numbers to the nearest 10 or 100.

Progress Indicator: E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers
3.NO.1l1 Identify the number of highlighted parts (numerator) of a given representation (rectangles and circles)
Number and Operations-Fractions
3 NF Develop understanding of fractions as numbers.
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.1l2 Identify the total number of parts (denominator) of a given representation (rectangles and circles)
Number and Operations-Fractions
3 NF Develop understanding of fractions as numbers.
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, thirds, eighths)
Number and Operations-Fractions
3 NF Develop understanding of fractions as numbers.
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.1l4 Identify that a part of a rectangle can be represented as a fraction that has a value between 0 and 1
Number and Operations-Fractions
3 NF Develop understanding of fractions as numbers.
3.NF.A.2a and 3.NF.A.2b Understand a fraction as a number on the number line; represent fractions on a number line diagram.
a) Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
b) Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

3.NO.1l5 Locate given common unit fractions (i.e., ½, ¼, ⅛) on a number line or ruler
Number and Operations-Fractions
3 NF Develop understanding of fractions as numbers.
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.
a) Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line. b) Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Progress Indicator: E.NO.1j applying place value concepts to read, write, and compare whole numbers up to 100,000; use expanded form; and round numbers to a given place
4.NO.1j5 Use place value to round to any place (i.e., ones, tens, hundreds, thousands)
Number and Operations in Base Ten
4 NBT Generalize place value understanding for multi-digit whole numbers.
4.NBT.A.3 Use place value understanding to round multi-digit whole numbers to any place.

4.NO.1j6 Compare multi-digit numbers using representations and numbers Number and Operations in Base Ten
4 NBT Generalize place value understanding for multi-digit whole numbers.
4.NBT.A.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

4.NO.1j7 Write or select the expanded form for a multi-digit number
Number and Operations in Base Ten
4 NBT Generalize place value understanding for multi-digit whole numbers.
4.NBT.A.2 Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

Progress Indicator: E.NO.1k explaining the meaning of place value (that one digit in one place represents 10 times what it represents in the place to its right)
4.NO.1k1 Compare the value of a number when it is represented in different place values of two 3-digit numbers
Number and Operations in Base Ten
4 NBT Generalize place value understanding for multi-digit whole numbers.
4.NBT.A.1 Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. For example, recognize that $700 \div 70 = 10$ by applying concepts of place value and division.

Progress Indicator: E.NO.1l identifying and locating fractions on the number line or as regions, or parts of a set or unit, and recognizing that whole numbers are a subset of rational numbers
4.NO.1l6 Locate fractions on a number line
Number and Operations - Fractions
3 NF Develop understanding of fractions as numbers.
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.
a) Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
b) Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

4.NO.1l7 Order fractions on a number line
Number and Operations - Fractions
3 NF Develop understanding of fractions as numbers.
3.NF.A.2 Understand a fraction as a number on the number line; represent fractions on a number line diagram.
a) Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
b) Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.

Progress Indicator: E.NO.1m composing and representing equivalent fractions in the form a/b
4.NO.1m1 Determine equivalent fractions
Number and Operations - Fractions
3 NF Develop understanding of fractions as numbers.
4 NF Extend understanding of fraction equivalence and ordering.
3.NF.A.3 Explain equivalence of fractions in special cases and compare fractions by reasoning about their size.
a) Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
b) Recognize and generate simple equivalent fractions (e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the fractions are equivalent, e.g., by using a visual fraction model.
c) Express whole numbers as fractions and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.
d) 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.
4.NF.A.1 Explain why a fraction a/b is equivalent to a fraction (n x a)/(n x 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.

Progress Indicator: E.NO.1n comparing and modeling fractions, including with different denominators
4.NO.1n1 Select a model of a given fraction (halves, thirds, fourths, sixths, eighths)
Number and Operations - Fractions
3 NF Develop understanding of fractions as numbers.
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.

4.NO.1n2 Compare up to 2 given fractions that have different denominators
Number and Operations - Fractions
4 NF Extend understanding of fraction equivalence and ordering.
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 benchmark fractions such as ½. 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.

Progress Indicator: E.NO.1o rewriting fractions as equivalent decimals
4.NO.1o1 Match a fraction with a denominator of 10 or 100 as a decimal (5/10 = .5)
Number and Operations - Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

4.NO.1o2 Find the equivalent decimal for a given fraction
Number and Operations - Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.5 Express a fraction with denominator 10 as an equivalent fraction with denominator 100 and use this technique to add two fractions with respective denominators 10 and 100. For example, express 3/10 as 30/100, and add 3/10 + 4/100 = 34/100.

Progress Indicator: E.NO.1p using number words to indicate decimal values (tenths, hundredths)
4.NO.1p1 Read, write or select decimals to the tenths place
Number and Operations - Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

4.NO.1p2 Read, write or select decimals to the hundredths place
Number and Operations - Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

Progress Indicator: E.NO.1q using and comparing decimals to the hundredths
4.NO.1q1 Compare two decimals to the tenths place with a value of less than 1
Number and Operations - Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, +, <, and justify the conclusions, e.g., by using a visual model.

4.NO.1q2 Compare two decimals to the hundredths place with a value of less than 1
Number and Operations - Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.7 Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, +, <, and justify the conclusions, e.g., by using a visual model.

Progress Indicator: M.NO.1a Explaining the meaning of place value (that a digit in one place represents 10 times what it represents to the place to its right).
4.NO.1a1 Compare the value of a number when it is represented in different place values of two 3-digit numbers
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.1. Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.

Progress Indicator: M.NO.1b extending place value understanding to reading (e.g., naming the values with number words, rather than "point four"), writing, comparing, and rounding decimals
5.NO.1b1 Read, write, or select a decimal to the hundredths place
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.3a Read, write, and compare decimals to thousandths.
a) Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000).

5.NO.1b2 Read, write or select a decimal to the thousandths place
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.3a Read, write, and compare decimals to thousandths.
a)Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., 347.392 = 3 x 100 + 4 x 10 + 7 x 1 + 3 x (1/10) + 9 x (1/100) + 2 x (1/1000).

5.NO.1b3 Compare two decimals to the thousandths place with a value of less than 1
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.3b Read, write, and compare decimals to thousandths.
b)Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.

5.NO.1b4 Round decimals to the next whole number
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.4 Use place value understanding to round decimals to any place.

5.NO.1b5 Round decimals to the tenths place
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.4 Use place value understanding to round decimals to any place.

5.NO.1b6 Round decimals to the hundredths place
Number and Operations in Base Ten
5 NBT Understand the place value system.
5.NBT.A.4 Use place value understanding to round decimals to any place.

Progress Indicator: M.NO.1c using a variety of fractional and decimal representations and locating them on a number line
5.NO.1c1 Rewrite a fraction as a decimal
Number and Operations – Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

5.NO.1c2 Rewrite a decimal as a fraction
Number and Operations – Fractions
4 NF Understand decimal notation for fractions and compare decimal fractions.
4.NF.C.6 Use decimal notation for fractions with denominators 10 or 100. For example, rewrite 0.62 as 62/100; describe a length as 0.62 meters; locate 0.62 on a number line diagram.

Middle School Progress Indicators

Progress Indicator: M.NO.1d representing integers (positive/negative numbers) and locating them on a number line
6.NO.1d1 Identify numbers as positive or negative
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
a) 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.
b) Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NO.1d2 Locate positive and negative numbers on a number line
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
a) 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.
b) Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NO.1d3 Plot positive and negative numbers on a number line
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
6.NS.C.6 Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
a) 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.
b) Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.
c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NO.1d4 Select the appropriate meaning of a negative number in a real-world situation
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
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.1d5 Find given points between -10 and 10 on both axis of a coordinate plane
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
6.NS.C.6c Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

6.NO.1d6 Label points between -10 and 10 on both axis of a coordinate plane
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
6.NS.C.6c Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.
c) Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.

Progress Indicator: M.NO.1e describing, representing, and comparing absolute value relationships
6.NO.1e1 Determine the meaning of absolute value
Expressions and Equations
6 NS Apply and extend previous understandings of numbers to the system of rational numbers.
6.NS.C.7c Understand ordering and absolute value of rational numbers.
a) Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation. *For example, for an account balance of -30 dollars write |-30| = 30 to describe the size of the debt in dollars.*

Progress Indicator: M.NO.1f recognizing equivalence of representations using fractions, decimals, and percents and using them solve ratio problems
6.NO.1f1 Find a percent of a quantity as rate per 100
Ratios and Proportional Relationships
6 RP Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.A.3c Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
c) 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.1f2 Write or select a ratio to match a given statement and representation
Ratios and Proportional Relationships
6 RP Understand ratio concepts and use ratio reasoning to solve problems.
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.NO.1f3 Select or make a statement to interpret a given ratio
Ratios and Proportional Relationships
6 RP Understand ratio concepts and use ratio reasoning to solve problems.
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.NO.1f4 Find a missing value (representations, whole numbers, common fractions, decimals to hundredths place, percent) for a given ratio
Ratios and Proportional Relationships
6 RP Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.A.3a Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
a) Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.

6.NO.1f5 Solve unit rate problems involving unit pricing
Ratios and Proportional Relationships
6 RP Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.A.3b Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
a) Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

Progress Indicator: M.NO.1i using exponents and scientific notation to express very large or very small quantities
6.NO.1i1 Identify what an exponent represents (e.g., $8^3 = 8 \times 8 \times 8$)
Number and Operations in Base Ten
5 NBT Understand the place value system.
Expressions and Equations
6 EE Apply and extend previous understandings of arithmetic to algebraic expressions.
4.NBT.A.2 Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
5.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.
6.NO.1i2 Solve numerical expressions involving whole number exponents
Expressions and Equations
6 EE Apply and extend previous understandings of arithmetic to algebraic expressions.
6.EE.A.1 Write and evaluate numerical expressions involving whole-number exponents.

Progress Indicator: M.NO.1g representing and using integers; comparing and expressing absolute value and additive inverse relationships
7.NO.1g1 Identify the additive inverse of a number (e.g., -3 and +3)
The Number System
7 NS Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
7.NS.A.1b, 7.NS.A.1c Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
a) Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
b) Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts.

7.NO.1g2 Identify the difference between two given numbers on a number line using absolute value
The Number System
7 NS Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
7.NS.A.1c Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.
c) Understand subtraction of rational numbers as adding the additive inverse, p – q = p + (–q). Show that the distance between two rational numbers on the number line is the absolute value of their difference and apply this principle in real-world contexts.

Progress Indicator: M.NO.1h recognizing and modeling fractions, decimals, and percents as different representations of rational numbers
7.NO.1h1 Identify an equivalent fraction, decimal and percent when given one of the three numbers
Ratios and Proportional Relationships
6 RP Understand ratio concepts and use ratio reasoning to solve problems.
6.RP.A.3d Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
d) Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

Progress Indicator: M.NO.1i using exponents and scientific notation to express very large or very small quantities
8.NO.1i1 Convert a number expressed in scientific notation up to 10,000
Expressions and Equations
8 EE Work with radicals and integer exponents.
8.EE.A.3 Use numbers expressed in the form of a single digit times a whole-number power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3 times 108 and the population of the world as 7 times 109, and determine that the world population is more than 20 times larger.

Progress Indicator: M.NO.1j Making interpretations and comparisons of scientific notation produced by technology or appearing in various media
8.NO.1j1 Perform operations with numbers expressed in scientific notation.
Expressions and Equations
8 EE Work with radicals and integer exponents.
8.EE.A.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

Progress Indicator: M.NO.1k distinguishing rational numbers (terminating and repeating) from irrational numbers (non-terminating and non-repeating), and recognizing that together they form the real number system and that both can be represented on the number line
8.NO.1k1 Identify π as an irrational number
The Number System
8 NS Know that there are numbers that are not rational and approximate them by rational numbers.
8.NS.A.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually and convert a decimal expansion which repeats eventually into a rational number.

8.NO.1k2 Round irrational numbers to the hundredths place
The Number System
8 NS Know that there are numbers that are not rational and approximate them by rational numbers.
8.NS.A.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually and convert a decimal expansion which repeats eventually into a rational number.

8.NO.1k3 Use approximations of irrational numbers to locate them on a number line
The Number System
8 NS Know that there are numbers that are not rational and approximate them by rational numbers.
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., π2). 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 to get better approximations.

High School Progress Indicators

Progress Indicator: H.NO.1a using exponents and scientific notation to represent quantities and expressions
H.NO.1a1 Represent quantities and expressions that use exponents
The Real Number System
N RN Extend the properties of exponents to rational exponents.
Algebra Overview
A SSE Write expressions in equivalent forms to solve problems.
HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.
HSA.SSE.B.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
c) Use the properties of exponents to transform expressions for exponential functions. For example the expression 1.15t can be rewritten as (1.151/12)12t ≈ 1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

H.NO.1a2 Explain the influence of an exponent on the location of a decimal point in each number
The Real Number System
N RN Extend the properties of exponents to rational exponents.
HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

H.NO1a3 Convert a number expressed in scientific notation
The Real Number System
N RN Extend the properties of exponents to rational exponents.
HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.