

Vertical Articulation of K-8 Operations Common Core State Standards for Mathematics

IMPORTANT Note: The operations included below are culminating operations. The CCSS require important prerequisite work at levels of cognitive demand not noted below. The purpose of this overview is a general, at-a-glance document that can be used as comparison when making judgments about content shifts for operations among grade levels in the CCSS versus the SC 2007 Academic Standards for Mathematics.

Addition	Subtraction	Multiplication	Division
<p>Kindergarten</p> <ul style="list-style-type: none"> Solve word problems requiring addition within 10 using objects, drawings and acting out Fluently add within 5 	<p>Kindergarten</p> <ul style="list-style-type: none"> Subtract within 10 using objects, drawings and acting out 		
<p>First Grade</p> <ul style="list-style-type: none"> Add within 100 using a two-digit number and a one-digit number, and add a two-digit number and a multiple of 10 Solve word problems requiring three whole numbers whose sum is not greater than 20. Use symbols for the unknown number when making 10 Fluently add within 10 	<p>First Grade</p> <ul style="list-style-type: none"> Subtract multiples of 10 in the range 10-90 from multiples of 10 in the range 10-90 Solve word problems within 20 Fluently subtract within 10 		
<p>Second Grade</p> <ul style="list-style-type: none"> Use addition within 100 to solve one- and two-step word problems Add within 1000, using concrete models or drawings Add up to 4 two-digit numbers Know from memory all sums of two one-digit numbers. Fluently add within 100 	<p>Second Grade</p> <ul style="list-style-type: none"> Use subtraction within 100 to solve one- and two-step word problems Subtract within 1000, using concrete models or drawings Fluently subtract within 100 		
<p>Third Grade</p> <ul style="list-style-type: none"> Fluently add within 1000 	<p>Third Grade</p> <ul style="list-style-type: none"> Fluently subtract within 1000 	<p>Third Grade</p> <ul style="list-style-type: none"> Know from memory all products of two one-digit numbers Use multiplication within 100 to solve word problems Fluently multiply and divide within 100 	<p>Third Grade</p> <ul style="list-style-type: none"> Use division within 100 to solve word problems Fluently divide within 100
<p>Fourth Grade</p> <ul style="list-style-type: none"> Solve multi-step word problems posed with whole numbers and having whole-number answers Fluently add multi-digit whole numbers <p>Fractions</p> <ul style="list-style-type: none"> Add mixed numbers with like denominators 	<p>Fourth Grade</p> <ul style="list-style-type: none"> Solve multi-step word problems posed with whole numbers and having whole-number answers Fluently subtract multi-digit whole numbers <p>Fractions</p> <p>Subtract mixed numbers with like denominators</p>	<p>Fourth Grade</p> <ul style="list-style-type: none"> Solve multi-step word problems posed with whole numbers and having whole-number answers Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers <p>Fractions</p> <ul style="list-style-type: none"> Multiply a fraction by a whole number 	<p>Fourth Grade</p> <ul style="list-style-type: none"> Solve multi-step word problems posed with whole numbers and having whole-number answers Find whole-number quotients and <u>remainders</u> with up to four-digit dividends and one-digit divisors

Addition	Subtraction	Multiplication	Division pg 2
<p>Fifth Grade</p> <p>Fractions</p> <ul style="list-style-type: none"> Add fractions with unlike denominators (including mixed numbers) <p>Decimals</p> <ul style="list-style-type: none"> Add decimals to hundredths 	<p>Fifth Grade</p> <p>Fractions</p> <ul style="list-style-type: none"> Subtract fractions with unlike denominators (including mixed numbers) <p>Decimals</p> <ul style="list-style-type: none"> Subtract decimals to hundredths 	<p>Fifth Grade</p> <ul style="list-style-type: none"> Fluently multiply multi-digit whole numbers <p>Fractions</p> <ul style="list-style-type: none"> Solve real world problems involving multiplication of fractions and mixed numbers <p>Decimals</p> <ul style="list-style-type: none"> Explain patterns in the placement of the decimal point when a decimal is multiplied by a <u>power of 10</u> Multiply decimals to hundredths 	<p>Fifth Grade</p> <ul style="list-style-type: none"> Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors <p>Fractions</p> <ul style="list-style-type: none"> Divide unit fractions by whole numbers and whole numbers by unit fractions <p>Decimals</p> <ul style="list-style-type: none"> Explain patterns in the placement of the decimal point when a decimal is divided by a power of 10 Divide decimals to hundredths
<p>Sixth Grade</p> <p>Decimals</p> <ul style="list-style-type: none"> Fluently add multi-digit decimals <p>Expressions, Equations & Inequalities</p> <ul style="list-style-type: none"> Reason about and solve one-variable equations and inequalities. Represent and analyze quantitative relationships between dependent and independent variables. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem Represent solutions of inequalities on number line diagrams 	<p>Sixth Grade</p> <p>Decimals</p> <ul style="list-style-type: none"> Fluently subtract multi-digit decimals <p>Expressions, Equations & Inequalities</p> <ul style="list-style-type: none"> Same as "Addition" Column 	<p>Sixth Grade</p> <p>Decimals</p> <ul style="list-style-type: none"> Fluently multiply multi-digit decimals <p>Expressions, Equations & Inequalities</p> <ul style="list-style-type: none"> Same as "Addition" Column 	<p>Sixth Grade</p> <ul style="list-style-type: none"> Fluently divide multi-digit numbers <p>Fractions</p> <ul style="list-style-type: none"> Divide fractions by fractions <p>Decimals</p> <ul style="list-style-type: none"> Fluently divide multi-digit decimals <p>Expressions, Equations & Inequalities</p> <ul style="list-style-type: none"> Same as "Addition" Column
Addition	Subtraction	Multiplication	Division pg 3
Seventh Grade	Seventh Grade	Seventh Grade	Seventh Grade

<ul style="list-style-type: none"> • Add rational numbers • Add and expand linear expressions with rational coefficients • Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units • Use proportional relationships to solve multi-step ratio and percent problems • Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals) • Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities 	<ul style="list-style-type: none"> • Subtract rational numbers • Subtract and expand linear expressions with rational coefficients 	<ul style="list-style-type: none"> • Multiply rational numbers • Factor and expand linear expressions with rational coefficients 	<ul style="list-style-type: none"> • Divide rational numbers • Convert a rational number to a decimal using long division
<p>Eighth Grade</p>	<p>Eighth Grade</p>	<p>Eighth Grade</p>	<p>Eighth Grade</p>
<ul style="list-style-type: none"> • Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used • Evaluate square roots of small perfect squares and cube roots of small perfect cubes • Solve linear equations in one variable • Analyze and solve pairs of simultaneous linear equations • Use functions to model relationships between quantities Not an "Operation" in the strictest sense but worthy of inclusion 	<ul style="list-style-type: none"> • Same as "Addition" Column 	<ul style="list-style-type: none"> • Same as "Addition" Column 	<ul style="list-style-type: none"> • Same as "Addition" Column