4th grade Mathematics Considerations from Achieve the Core/CCSSO

2020–21 Priority Instructional Content in English Language Arts/Literacy and Mathematics

Grade 4 Mathematics Priority Instructional Content for the 2020–21 School Year

The Mathematics Priority Instructional Content for the 2020–21 School Year (Mathematics Instructional Priorities) is designed to support decisions about how to elevate some of the most important mathematics at each grade level in the coming school year while reducing time and intensity for topics that are less integral to the overall coherence of college- and career-ready standards.

At each grade level from kindergarten through grade 8, the Mathematics Instructional Priorities name the grade-level mathematics that is of highest priority at each grade; provide a framework for strategically drawing in prior grade-level content that has been identified as essential for supporting students' engagement with the most important grade-level work; and suggest ways to reduce or sometimes eliminate topics in a way that minimizes the impact to overall coherence. In using this guidance, decision makers should thoughtfully consider in their unique context the likely implications of the spring 2020 disruption as decisions are made to select supports to ensure that students are able to successfully engage with the grade-level content. Decision makers should also bear in mind that while this document articulates content priorities, elevating the Standards for Mathematical Practice in connection with grade-level content is always a priority.

At each grade level, recommendations are provided for facilitating social, emotional, and academic development (SEAD) in mathematics. These recommendations stress themes of discourse, belonging, agency and identity and can either be applied across grades (even if only listed in one) or they can be modified to fit different grades. These themes of discourse, belonging, agency, and identity are integral to the Standards of Mathematical Practice and the language in the recommendations reflects this connection.

The 2020–21 school year presents a unique set of opportunities and challenges due to the disruption to instruction in spring 2020 as well as the uncertainty associated with the 2020–2021 school year. The Mathematics Instructional Priorities are provided in response to these conditions. They are not criteria, and they do not revise the standards. Rather, they are potential ways, and not the only ways possible, to help students engage deeply with grade-level mathematics in the 2020–21 school year.

The Mathematics Instructional Priorities do not stand alone but are to be used in conjunction with college- and career-ready standards. One reason for this is that codes such as 4.NBT.A must be traced back to the standards in order to see the language to which they refer. The Mathematics Instructional Priorities do not reiterate what the standards already say—even in cases where the specific language of a standard is fundamentally important to a high-quality aligned curriculum. Nor do the Mathematics Instructional Priorities mention every opportunity the standards afford to make coherent connections within a grade or between one grade and another—again, even when those connections are fundamentally important and are the basis for the guidance given. Therefore the Mathematics Instructional Priorities will be used most powerfully in cross-grade collaboration among educators who know the standards well and can use existing resources such as the *Progressions* documents and other resources listed in the Appendix.

While the grade-level guidance isn't specific to any math program or set of programs, an examination of a selection of curriculum scope and sequence documents informed the recommendations, especially recommendations about when and how to integrate prior-grade concepts into the current grade. The guidance does not list all possible prior-grade content relevant to the current grade, but instead concentrates the recommendations on the most critical prior-grade connections, with greater emphasis on that content which was likely taught during the last third of the 2019–20 school year based on the scope and sequence analysis.

Where to focus Grade 4 Mathematics?

College- and career-ready mathematics standards have important emphases at each grade level, which for grade 4 are highlighted in this Focus Document. The considerations for the 2020–21 school year that follow are intended to be a companion to the Focus Document. Users should have both documents in hand, as well as a copy of grade-level standards, when considering these recommendations.

For the 2020–21 school year, prioritization of grade-level mathematical concepts combined with some incorporation of prior-grade knowledge and skills will be essential to support all students in meeting grade-level expectations. For these unique times, Student Achievement Partners has developed additional guidance above and beyond what is communicated through the major work designations. As described at greater length on the previous page, the following tables:

- Name priority instructional content at each grade;
- Provide considerations for addressing grade-level content in a coherent way;
- Articulate selected content from the prior grade that may be needed to support students in fully engaging with grade-level mathematics;
- Suggest where adaptations can be made to allow for additional time on the most important topics; and
- Provide suggestions for ways to promote social, emotional, and academic development (SEAD) in grade-level mathematics learning, often through the Standards for Mathematical Practice.

The considerations repeatedly use several verbs, such as *combine*, *integrate*, etc. The verbs most commonly used in the considerations are italicized below and defined in a glossary in the Appendix. Note that content is designated at the cluster level when the guidance refers to the cluster and its standards, and at the standard level in cases where guidance varies within a cluster.

Considerations for Addressing PRIORITY Grade-Level Content	
The clusters and standards listed in this table name the priority instructional content for grade 4. The right-hand column contains approaches to shifting how time is dedicated to the clusters and standards in the left-hand column.	
Clusters/Standards	**Considerations**
4.OA.A	No special considerations for curricula well aligned to analyzing and solving multi-step word problems with the four operations (4.OA.3), and extending multiplicative thinking beyond grade 3 to solve problems involving comparison and the idea of times-as-many/times-as-much (4.OA.2).
4.NBT.A	No special considerations for curricula well aligned to generalizing place value understanding, as detailed in this cluster. Time spent on instruction and practice should NOT be reduced.
4.NF.A	No special considerations for curricula well aligned to fraction equivalence and ordering, as detailed in this cluster. *Incorporate* some foundational work on simple equivalent fractions (3.NF.A.3). Time spent on instruction and practice should NOT be reduced.
4.NF.C	No special considerations for curricula well aligned to concepts of decimal fractions, as detailed in this cluster. Time spent on instruction and practice should NOT be reduced.

Considerations for Addressing REMAINING Grade-Level Content	
The clusters and standards listed in this table represent the remainder of grade 4 grade-level content. The right-hand column contains approaches to shifting how time is dedicated to the clusters and standards in the left-hand column.	
Clusters/Standards	**Considerations**
4.OA.B	*Incorporate* opportunities to solidify the fluency expectations of 3.OA.C.7 by giving additional practice sets related to products of single-digit factors and related quotients (with unknowns in all positions) into the grade 4 work of gaining familiarity with factors and multiples.

4.OA.C	*Eliminate* lessons on generating and analyzing patterns.
4.NBT.B*	In relation to fluency expectations for subtracting multi-digit numbers, *emphasize* problems with only one regrouping step (4.NBT.B.4), in order to reduce algorithmic complexity. *Incorporate* fluency expectations of 3.OA.C.7 by giving additional practice sets related to products of single-digit factors and related quotients (with unknowns in all positions) into the grade 4 work on multi-digit multiplication and division (4.NBT.5 & 6). (Note that there are no fluency expectations for multi-digit multiplication or division in grade 4; repetitive fluency exercises are not required.)
4.NF.B*	*Emphasize* reasoning with unit fractions to determine sums and products, not committing calculation rules to memory or engaging in repetitive fluency exercises. *Incorporate* some foundational work on the meaning of the unit fraction (3.NF.A.1 & 2), especially through partitioning the whole on a number line diagram.
4.MD.A.1	No special considerations for curricula well aligned to measurement conversion, as detailed in this standard. Time spent on instruction and practice should not exceed what would be spent in a typical year.
4.MD.A.2 4.MD.A.3	*Combine* lessons on problems involving measurement, except for those on measurement conversion (see 4.MD.A.1). *Limit* the amount of required student practice.
4.MD.B	*Eliminate* lessons and problems that do not strongly reinforce the fraction work of this grade (4.NF).
4.MD.C.5 4.MD.C.6	*Emphasize* the foundational understanding of a one-degree angle as a unit of measure (4.MD.C.5a) and use that as the basis for measuring and drawing angles with protractors (4.MD.C.6).
4.MD.C.7	*Eliminate* lessons on recognizing angle measure as additive.
4.G.A	*Combine* lessons on drawing and identifying lines and angles and classifying shapes by properties. *Limit* the amount of required student practice.

*While these clusters are Major Work of the Grade, during the 2020–21 school year, it is recommended that they receive lighter treatment in favor of other priority instructional content.

Facilitate Social, Emotional, and Academic Development (SEAD)[13] Through Grade-Level Content
The left-hand column contains sample actions for how SEAD can be effectively integrated into grade-level mathematics instruction, in connection with Standards for Mathematical Practice named in the right-hand column. Efforts should be made to facilitate SEAD even in remote learning environments, using synchronous and asynchronous approaches and the capabilities afforded by remote learning technologies.

Sample Actions	Connection to Standards for Mathematical Practice (SMP)
Bring in students' funds of knowledge and past mathematical experiences by providing access to a wide variety of math tools when working on grade-level math (for example, providing number lines when studying equivalent fractions).	MP5: Use appropriate tools strategically.
Position students as mathematically competent by creating a safe space for students to share their developing reasoning (for example, when they make conjectures and arguments about whole numbers to determine whether they apply to fractions and decimals).	MP3: Construct viable arguments and critique the reasoning of others.
Establish clear learning goals that promote mathematical learning as just, equitable, and inclusive. For example, in work with subtraction of multi-digit numbers, begin with one regrouping step using evidence of student learning to determine next steps (exit tickets, assigned problem).	MP7: Look for and make use of structure.

[13] Sample SEAD actions contribute to students' sense of belonging and safety, efficacy, value for effort and growth, as well as a sense of engagement in work that is relevant and culturally responsive. The actions can be modified to fit any grade, K–8, by considering the content of that grade level. See other grade-level Mathematics Instructional Priorities documents for additional samples.

4th Grade Math Important Prerequisites

Prerequisite Standard Address before or within grade-level instruction	Grade-Level Standard ■ Major ▣ Supporting ▣ Additional	Standard Language	Instructional Time Preserve or reduce time in 20-21 as compared to a typical year, per SAP guidance
	▣4.G.A.1 *Conceptual, Procedural*	Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.	*Combine lessons on drawing and identifying lines and angles and classifying shapes by properties. Limit the amount of required student practice.*
	▣4.G.A.2 *Conceptual*	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	
	▣4.G.A.3 *Conceptual*	Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into matching parts. Identify line-symmetric figures and draw lines of symmetry.	
3.MD.A.2	▣4.MD.A.1 *Conceptual, Procedural*	Know relative sizes of measurement units within one system of units including km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec. Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. Record measurement equivalents in a two-column table. For example: Know that 1 ft is 12 times as long as 1 in. Express the length of a 4 ft snake as 48 in. Generate a conversion table for feet and inches listing the number pairs (1, 12), (2, 24), (3, 36), …	
	▣4.MD.A.2 *Application*	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	*Combine lessons on problems involving measurement, except for those on measurement conversion (see 4.MD.A.1). Limit the amount of required student practice.*
3.MD.D.8	▣4.MD.A.3 *Application, Procedural*	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.	
	▣4.MD.B.4 *Application*	Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8). Solve problems involving addition and subtraction of fractions by using information presented in line plots. For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.	*Eliminate lessons and problems that do not strongly reinforce the fraction work of this grade (4.NF).*

	Standard	Description	Notes
	⊠4.MD.C.5 *Conceptual*	Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement: a) An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles. b) An angle that turns through n one-degree angles is said to have an angle measure of n degrees.	*Emphasize the foundational understanding of a one-degree angle as a unit of measure (4.MD.C.5a) and use that as the basis for measuring and drawing angles with protractors (4.MD.C.6).*
	⊠4.MD.C.5a *Conceptual*	An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through 1/360 of a circle is called a "one-degree angle," and can be used to measure angles.	
	⊠4.MD.C.5b *Conceptual*	An angle that turns through ⊠ one-degree angles is said to have an angle measure of ⊠ degrees.	
	⊠4.MD.C.6 *Procedural*	Measure angles in whole-number degrees using a protractor. Sketch angles of specified measure.	
	⊠4.MD.C.7 *Conceptual,* *Application,* *Procedural*	Recognize angle measure as additive. When an angle is decomposed into non-overlapping parts, the angle measure of the whole is the sum of the angle measures of the parts. Solve addition and subtraction problems to find unknown angles on a diagram in real world and mathematical problems, e.g., by using an equation with a symbol for the unknown angle measure.	*Eliminate lessons on recognizing angle measure as additive.*
3.NF.A.1 3.NF.A.2a-b 3.NF.A.3a-d	■4.NF.A.1 *Conceptual*	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.	*Incorporate some foundational work on the meaning of the unit fraction (3.NF.1 & 2), especially through partitioning the whole on a number line diagram.*
	■4.NF.A.2 *Conceptual*	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	
	■4.NF.B.3 *Conceptual,* *Procedural*	Understand a fraction ⊠/⊠ with ⊠ > 1 as a sum of fractions 1/⊠.	*Emphasize reasoning with unit fractions to determine sums and products, not committing calculation rules to memory or engaging in repetitive fluency exercises.*
	■4.NF.B.3a *Conceptual*	Understand addition and subtraction of fractions as joining and separating parts referring to the same whole.	
	■4.NF.B.3b *Conceptual*	Decompose a fraction into a sum of fractions with the same denominator in more than one way, recording each	

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		decomposition by an equation. Justify decompositions, e.g., by using a visual fraction model. Examples: 3/8 = 1/8 + 1/8 + 1/8 ; 3/8 = 1/8 + 2/8 ; 2 1/8 = 1 + 1 + 1/8 = 8/8 + 8/8 + 1/8.	
	■4.NF.B.3c Conceptual, Procedural	Add and subtract mixed numbers with like denominators, e.g., by replacing each mixed number with an equivalent fraction, and/or by using properties of operations and the relationship between addition and subtraction.	
	■4.NF.B.3d Application	Solve word problems involving addition and subtraction of fractions referring to the same whole and having like denominators, e.g., by using visual fraction models and equations to represent the problem.	
	■4.NF.B.4 Conceptual, Procedural	Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.	
	■4.NF.B.4a Conceptual	Understand a fraction a/b as a multiple of 1/b. For example, use a visual fraction model to represent 5/4 as the product 5 × (1/4), recording the conclusion by the equation 5/4 = 5 × (1/4).	
	■4.NF.B.4b Conceptual	Understand a multiple of a/b as a multiple of 1/b, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express 3 × (2/5) as 6 × (1/5), recognizing this product as 6/5. (In general, n × (a/b) = (n × a)/b.)	
	■4.NF.B.4c Application	Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. For example, if each person at a party will eat 3/8 of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?	
	■4.NF.C.5 Procedural	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.	
	■4.NF.C.6 Procedural, Conceptual, Application	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.NF.C.7 Conceptual	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 >, =, or <, and justify the conclusions, e.g., by using a visual model.	
	■4.NBT.A.1 Conceptual	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 ÷ 70 = 10 by applying concepts of place value and division.	
	■4.NBT.A.2 Conceptual, Procedural	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.	

3.NBT.A.1	■4.NBT.A.3 *Conceptual, Procedural*	Use place value understanding to round multi-digit whole numbers to any place.	*First tasks should involve rounding to tens and hundreds.*
3.NBT.A.2	■4.NBT.B.4 *Procedural*	Fluently add and subtract multi-digit whole numbers using the standard algorithm.	*Emphasize problems with only one regrouping step.*
3.MD.C.7a-c, 3.NBT.A.3, 3.OA.A.1, 3.OA.B.5, 3.OA.C.7	■4.NBT.B.5 *Conceptual, Procedural*	Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	
3.OA.A.2, 3.OA.B.5, 3.OA.B.6, 3.OA.C.7	■4.NBT.B.6 *Conceptual, Procedural*	Find whole-number quotients and remainders with up to four-digit dividends and one-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.	
3.OA.A.1, 3.OA.A.2, 3.OA.A.4, 3.OA.B.6, 3.OA.C.7	■4.OA.A.1 *Conceptual*	Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 x 7 as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.	
	■4.OA.A.2 *Application*	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	
3.OA.C.7, 3.OA.D.8	■4.OA.A.3 *Application*	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.	
	▨4.OA.B.4 *Conceptual, Procedural*	Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.	
3.OA.D.9	▨4.OA.C.5 *Conceptual, Procedural*	Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*	*Eliminate lessons on generating and analyzing patterns.*

- **What should we make of standards that have an important prerequisite that needs to be addressed, but a reduction in instructional time is also recommended?** These considerations should be weighed together, along with the needs of your group of students. For example, the time spent on a standard might be reduced from five days to three days by de-emphasizing one part of the standard, but prior-grade needs might be addressed within the first lesson through strategic choice of tasks.

Category	Meaning	Example	Actions to take
Address **before** grade-level instruction	Without this prior knowledge, students most likely do not have a way to access the grade-level standard.	A 7th-grader who has not learned how to divide positive fractions (6.NS.A.1) needs to build that understanding before beginning to divide negative fractions (7.NS.A.2c).	Students may require **dedicated instruction** on prerequisite standards before the grade level instruction is taught. (Not every standard needs its own full lesson; multiple standards may be addressed at once, or a standard might be taught as a short mini-lesson.)
Address **within** grade-level instruction	Students will have an entry point into grade-level content, but will benefit from instruction that weaves in this prior-grade content.	A 4th-grader who struggles with recalling multiplication facts (3.OA.C.7) can still access grade-level, multi-step application problems (4.OA.A.3) when given a multiplication table, but will need small doses of continued support to attain fluency.	**Individual tasks or strategies** from these standards can be incorporated into grade-level lessons to address important content that was missed in the prior grade.

See Complete K-8 Documents here:

2020–21 Priority Instructional Content from Achieve the Core
https://achievethecore.org/content/upload/2020%E2%80%9321%20Priority%20Instructional%20Content%20in%20ELA%20Literacy%20and%20Mathematics_June%202020.pdf

Math Important prerequisite skills list from CCSSO:
https://docs.google.com/document/d/1mcApF1n7sPI7XsrIx29Ab_tmAAvne4A-VuJKSWb_qSg/edit