7th grade Mathematics Considerations from Achieve the Core/CCSSO

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

Grade 7 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 7.RP.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 7 Mathematics?

College- and career-ready mathematics standards have important emphases at each grade level, which for grade 7 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 7. 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**
7.RP.A	No special considerations for curricula well aligned to analyzing proportional relationships, as detailed by the cluster. Time spent on instruction and practice should NOT be reduced.
7.NS.A	*Incorporate* foundational work on understandings of rational numbers (6.NS.C.5, 6, and 7) to build towards operations with rational numbers (7.NS.A), as detailed by the cluster.
7.EE.A	*Incorporate* foundational work on writing and transforming linear expressions from grade 6 (6.EE.A) into the work of using properties of operations to generate equivalent expressions, as detailed by the cluster (7.EE.A).
7.EE.B.3	No special considerations for curricula well aligned to solving multi-step real-life and mathematical problems, as detailed by the standard. Time spent on instruction and practice should NOT be reduced.
7.EE.B.4	*Emphasize* equations relative to inequalities. *Incorporate* foundational work of reasoning about and solving one-variable equations (6.EE.B) to support students' work on constructing equations to solve problems, as detailed by the standard (7.EE.B.4). Time spent on instruction and practice relating to equations should NOT be reduced.

Considerations for Addressing REMAINING Grade-Level Content	
The clusters and standards listed in this table represent the remainder of grade 7 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**
7.G.A.1	*Reduce* time spent creating scale drawings by hand. Time spent on instruction and practice should not exceed what would be spent in a typical year.
7.G.A.2 7.G.A.3	*Eliminate* lessons on drawing and constructing triangles, as detailed in the standard (7.G.A.2). *Eliminate* lessons on analyzing figures that result from slicing three-dimensional figures, as detailed in the standard (7.G.A.3).
7.G.B.4	*Combine* lessons on knowing and using the formulas for the area and circumference of a circle in order to reduce the amount of time spent on this topic. *Limit* the amount of required student practice.
7.G.B.5 7.G.B.6	*Combine* lessons to address key concepts and skills of unknown angles, area, volume, and surface area (7.G.B.5, 7.G.B.6). *Reduce* the amount of required student practice. *Incorporate* conceptual understanding of finding the area of polygons and the volume of right rectangular prisms (6.G.A.1, 6.G.A.2) in teaching real-life and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects (7.G.B.6). Do not require students to use or draw nets to determine surface area.
7.SP.A 7.SP.B	*Combine* lessons on using random sampling to draw inferences about a population and using measures of center and variability to draw comparative inferences about two populations in order to reduce the amount of time spent on this topic. *Incorporate* students' grade 6 understanding of statistical variability (6.SP.A). *Limit* the amount of required student practice. *Eliminate* lessons and problems on assessing the degree of overlap on data distributions, as detailed in the standard (7.SP.B.3).

7.SP.C	*Combine* lessons on developing, using, and evaluating probability models in order to emphasize foundational concepts and reduce the amount of time spent on this topic (7.SP.C). *Limit* the amount of required student practice. *Eliminate* lessons and problems on finding probabilities of compound events, as detailed in the standard (7.SP.C.8).

Facilitate Social, Emotional, and Academic Development (SEAD)[16] 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 by ensuring materials and problems have a connection with learners while also providing opportunities to learn about the broader world, such as when solving rich tasks involving geometric measurement that have a significant modeling component.	MP4: Model with mathematics
Communicate that students' thinking is valued to build trust and rapport by asking questions that elicit students' thinking, such as when students are analyzing proportional relationships.	MP1: Make sense of problems and persevere in solving them.
Position students as competent and elevate the status of students by valuing different contributions students make when they share representations and make connections between these representations (for example, tables, graphs, equations, and verbal descriptions of proportional relationships).	MP3: Construct viable arguments and critique the reasoning of others.

[16] 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.

7th 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
6.EE.A.2a-b, 6.EE.A.3, 6.EE.A.4	■7.EE.A.1 *Conceptual, Procedural*	Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.	
	■7.EE.A.2 *Conceptual*	Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. *For example, a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."*	
	■7.EE.B.3 *Procedural, Application*	Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. Apply properties of operations as strategies to calculate with numbers in any form; convert between forms as appropriate; and assess the reasonableness of answers using mental computation and estimation strategies. *For example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a new salary of $27.50. If you want to place a towel bar 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation.*	
	■7.EE.B.4 *Conceptual, Procedural, Application*	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.	*Emphasize equations (7.EE.B.4a) relative to inequalities (7.EE.B.4b).*
6.EE.B.5, 6.EE.B.6, 6.EE.B.7	■7.EE.B.4a *Conceptual, Procedural, Application*	Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*	
6.EE.B.8	■7.EE.B.4b *Conceptual, Procedural, Application*	Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers. Graph the solution set of the inequality and interpret it in the context of the problem. *For example, As a salesperson, you are paid $50 per week plus $3 per sale. This week you want your pay to be at least $100. Write an inequality for the number of sales you need to make, and describe the solutions.*	
6.G.A.1, 6.G.A.3	■7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	*Reduce time spent creating scale drawings by hand.*

	Procedural, Application		
	7.G.A.2 *Conceptual, Procedural*	Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle.	*Eliminate lessons on drawing and constructing triangles as detailed in this standard.*
	7.G.A.3 *Conceptual*	Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.	*Eliminate lessons on analyzing figures that result from slicing three-dimensional figures as detailed in this standard.*
	7.G.B.4 *Conceptual, Procedural, Application*	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	*Combine lessons on knowing and using the formulas for the area and circumference of a circle in order to reduce the amount of time spent on this topic. Limit the amount of required student practice.*
	7.G.B.5 *Conceptual, Procedural*	Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure.	*Combine lessons to address key concepts and skills of unknown angles, area, volume, and surface area (7.G.B.5, 7.G.B.6). Reduce the amount of required student practice. Do not require students to use or draw nets to determine surface area.*
6.G.A.1, 6.G.A.2, 6.G.A.4	7.G.B.6 *Procedural, Application*	Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.	
6.NS.B.3, 6.NS.C.6a, 6.NS.C.6c, 6.NS.C.7a-d	7.NS.A.1 *Conceptual, Procedural*	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.	
	7.NS.A.1a *Conceptual, Application*	Describe situations in which opposite quantities combine to make 0. *For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.*	
	7.NS.A.1b *Conceptual, Application*	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.	
	7.NS.A.1c *Conceptual, Application*	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.NS.A.1d *Conceptual, Procedural*	Apply properties of operations as strategies to add and subtract rational numbers.	
6.NS.A.1, 6.NS.B.3	■7.NS.A.2 *Conceptual, Procedural*	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	
	■7.NS.A.2a *Conceptual, Application*	Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.	
	■7.NS.A.2b *Conceptual, Application*	Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then -(p/q) = (-p)/q = p/(-q). Interpret quotients of rational numbers by describing real-world contexts.	
	■7.NS.A.2c *Conceptual, Procedural*	Apply properties of operations as strategies to multiply and divide rational numbers.	
	■7.NS.A.2d *Conceptual, Procedural*	Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.	
	■7.NS.A.3 *Procedural, Application*	Solve real-world and mathematical problems involving the four operations with rational numbers.	
6.EE.C.9, 6.RP.A.1, 6.RP.A.2, 6.RP.A.3a-c, 6.RP.A.3d	■7.RP.A.1 *Procedural, Application*	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction (1/2)/(1/4) miles per hour, equivalently 2 miles per hour.*	
	■7.RP.A.2 *Conceptual, Application*	Recognize and represent proportional relationships between quantities.	
	■7.RP.A.2a *Conceptual*	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.	
	■7.RP.A.2b *Conceptual, Procedural, Application*	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	

	7.RP.A.2c *Conceptual, Procedural, Application*	Represent proportional relationships by equations. *For example, if total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn.*	
	7.RP.A.2d *Conceptual*	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r) where r is the unit rate.	
	7.RP.A.3 *Application*	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	
6.SP.A.1	7.SP.A.1 *Conceptual*	Understand that statistics can be used to gain information about a population by examining a sample of the population; generalizations about a population from a sample are valid only if the sample is representative of that population. Understand that random sampling tends to produce representative samples and support valid inferences.	*Combine lessons on using random sampling to draw inferences about a population and using measures of center and variability to draw comparative inferences about two populations in order to reduce the amount of time spent on this topic. Limit the amount of required student practice.*
	7.SP.A.2 *Conceptual, Application*	Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Generate multiple samples (or simulated samples) of the same size to gauge the variation in estimates or predictions. *For example, estimate the mean word length in a book by randomly sampling words from the book; predict the winner of a school election based on randomly sampled survey data. Gauge how far off the estimate or prediction might be.*	
6.SP.A.1, 6.SP.A.2	7.SP.B.3 *Conceptual, Application*	Informally assess the degree of visual overlap of two numerical data distributions with similar variabilities, measuring the difference between the centers by expressing it as a multiple of a measure of variability. *For example, the mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team, about twice the variability (mean absolute deviation) on either team; on a dot plot, the separation between the two distributions of heights is noticeable.*	*Eliminate lessons and problems on assessing the degree of overlap on data distributions as detailed in this standard.*
	7.SP.B.4 *Conceptual, Application*	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. *For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.*	
	7.SP.C.5 *Conceptual*	Understand that the probability of a chance event is a number between 0 and 1 that expresses the likelihood of the event occurring. Larger numbers indicate greater likelihood. A probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event.	*Combine lessons on developing, using and evaluating probability models in order to emphasize foundational concepts and reduce the amount of time spent on this topic. Limit the amount of required student practice.*
	7.SP.C.6 *Conceptual, Application*	Approximate the probability of a chance event by collecting data on the chance process that produces it and observing its long-run relative frequency, and predict the approximate relative frequency given the probability. *For example, when rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times, but probably not exactly 200 times.*	

	7.SP.C.7 *Conceptual, Application*	Develop a probability model and use it to find probabilities of events. Compare probabilities from a model to observed frequencies; if the agreement is not good, explain possible sources of the discrepancy.	
	7.SP.C.7a *Application*	Develop a uniform probability model by assigning equal probability to all outcomes, and use the model to determine probabilities of events. *For example, if a student is selected at random from a class, find the probability that Jane will be selected and the probability that a girl will be selected.*	
	7.SP.C.7b *Application*	Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. *For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?*	
	7.SP.C.8 *Procedural, Application*	Find probabilities of compound events using organized lists, tables, tree diagrams, and simulation.	*Eliminate lessons and problems on finding probabilities of compound events as detailed in this standard.*
	7.SP.C.8a *Conceptual*	Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.	
	7.SP.C.8b *Conceptual, Application*	Represent sample spaces for compound events using methods such as organized lists, tables and tree diagrams. For an event described in everyday language (e.g., "rolling double sixes"), identify the outcomes in the sample space which compose the event.	
	7.SP.C.8c *Application*	Design and use a simulation to generate frequencies for compound events. *For example, use random digits as a simulation tool to approximate the answer to the question: If 40% of donors have type A blood, what is the probability that it will take at least 4 donors to find one with type A blood?*	

- **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