Louisiana STUDENT STANDARDS MATHEMATICS

MATH — MATHEMATICS | 7 — GRADE | F — FOCUS

This focus document shows where students and teachers should spend the large majority of their time in order to meet the expectations of the Louisiana Student Standards for Mathematics.

Not all content in a given grade is emphasized equally in the standards. Some clusters require greater emphasis than others based on the depth of the ideas, the time that they take to master, and/or their importance to future mathematics or the demands of college and career readiness. More time in these areas is also necessary for students to meet the Louisiana Standards for Mathematical Practice.

To say that some things have greater emphasis is not to say that anything in the standards can safely be neglected in instruction. Neglecting material will leave gaps in student skill and understanding and may leave students unprepared for the challenges of a later grade.

MAJOR, SUPPORTING, AND ADDITIONAL CLUSTERS FOR GRADE 7

Emphases are given at the cluster level. Refer to the Louisiana Student Standards for Mathematics for the specific standards that fall within each cluster. Students should spend the large majority[1] of their time on the major work of the grade.[2]

■ Major Clusters ▢ Supporting Clusters ○ Additional Clusters

7.RP.A	■	Analyze proportional relationships and use them to solve real-world and mathematical problems.
7.NS.A	■	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.
7.EE.A	■	Use properties of operations to generate equivalent expressions.
7.EE.B	■	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.
7.G.A	○	Draw, construct and describe geometrical figures and describe the relationships between them.
7.G.B	○	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.
7.SP.A	▢	Use random sampling to draw inferences about a population.
7.SP.B	○	Draw informal comparative inferences about two populations.
7.SP.C	▢	Investigate chance processes and develop, use, and evaluate probability models.

HIGHLIGHTS OF MAJOR WORK IN GRADES K–8

K–2	Addition and subtraction – concepts, skills, and problem solving; place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional relationships; early expressions and equations
7	Ratios and proportional relationships; arithmetic of rational numbers
8	Linear algebra and linear functions

1 At least 65% and up to approximately 85% of class time, with Grades K–2 nearer the upper end of that range, should be devoted to the major work of the grade.
2 Note, the critical areas are a survey of what will be taught at each grade level; the major work is the subset of topics that deserve the large majority of instructional time during a given year to best prepare students for college and careers.

EXAMPLES OF KEY ADVANCES FROM GRADE 6 TO GRADE 7

This section highlights some of the major grade-to-grade steps in the progression of increasing knowledge and skill detailed in the standards. Each key advance in mathematical content also corresponds to a widening scope of problems that students can solve. Examples of key advances are highlighted to stress the need to treat topics in ways that take into account where students have been in previous grades and where they will be going in subsequent grades.

- In grade 6, students learned about negative numbers and the kinds of quantities they can be used to represent; they also learned about absolute value and ordering of rational numbers, including in real-world contexts. In grade 7, students will add, subtract, multiply, and divide within the system of rational numbers.
- Students grow in their ability to analyze proportional relationships. They decide whether two quantities are in a proportional relationship (7.RP.A.2a); they work with percents, including simple interest, percent increase and decrease, tax, markups and markdowns, gratuities and commission, and percent error (7.RP.A.3); they analyze proportional relationships and solve problems involving unit rates associated with ratios of fractions (e.g., if a person walks 1/2 mile in each 1/4 hour, the unit rate is the complex fraction ½ / ¼ miles per hour or 2 miles per hour) (7.RP.A.1); and they analyze proportional relationships in geometric figures (7.G.A.1).
- Students solve a variety of problems involving angle measure, area, surface area, and volume (7.G.B.4–6).

FLUENCY EXPECTATIONS OR EXAMPLES OF CULMINATING STANDARDS

This section highlights individual standards that set expectations for fluency or that represent culminating masteries. Fluency standards are highlighted to stress the need to provide sufficient supports and opportunities for practice to help students meet these expectations. Wherever the word "fluently" appears in a content standard, it is used to mean "quickly and accurately." A key aspect of fluency in this sense is that it does not happen all at once in a single grade, but requires attention to student understanding as they progress towards college/career readiness. It is important to ensure that sufficient practice and extra support are provided at each grade, to allow all students to meet the standards that call explicitly for fluency. Fluency is not meant to come at the expense of understanding but is an outcome of a progression of learning and sufficient thoughtful practice. It is important to provide the conceptual building blocks that develop understanding in tandem with skill along the way to fluency; the roots of this conceptual understanding often extend to one or more grades earlier in the standards than the grade when fluency is finally expected. Culminating standards are highlighted to help give a sense of critical foundations needed to maintain progressions from grade to grade.

7.EE.B.3 Students solve multistep problems posed with positive and negative rational numbers in any form (whole numbers, fractions, and decimals), using tools strategically. This work is the culmination of many progressions of learning in arithmetic, problem solving and mathematical practices.

7.EE.B.4a In solving word problems leading to one-variable equations of the form px + q = r and p(x + q) = r, students solve the equations fluently. This will require fluency with rational number arithmetic (7.NS.A.1–3), as well as fluency to some extent with applying properties operations to rewrite linear expressions with rational coefficients (7.EE.A.1).

7.NS.A.1–2 Adding, subtracting, multiplying, and dividing rational numbers is the culmination of numerical work with the four basic operations. The number system will continue to develop in grade 8, expanding to become the real numbers by the introduction of irrational numbers, and will develop further in high school, expanding to become the complex numbers with the introduction of imaginary numbers. Because there are no specific standards for rational number arithmetic in later grades and because so much other work in grade 7 depends on rational number arithmetic (see below), fluency with rational number arithmetic should be the goal in grade 7.

EXAMPLES OF MAJOR WITHIN-GRADE DEPENDENCIES

This section highlights cases in which a body of content within a given grade depends, conceptually or logically, upon another body of content within that same grade. Examples of within-grade dependencies are highlighted to stress the need to organize material coherently within the grade. (Because of space limitations, only examples of large-scale dependencies are described in this section, but coherence is important for dependencies that exist at finer grain sizes as well.)

- Meeting standard 7.EE.B.3 in its entirety will involve using rational number arithmetic (7.NS.A.1–3) and percents (7.RP.A.3). Work leading to meeting this standard could be organized as a recurring activity that tracks the students' ongoing acquisition of new skills in rational number arithmetic and percents.
- Because rational number arithmetic (7.NS.A.1–3) underlies the problem solving detailed in 7.EE.B.3 as well as the solution of linear expressions and equations (7.EE.A.1–2, 4), this work should likely begin at or near the start of the year.
- The work leading to meeting standards 7.EE.A.1–4 could be divided into two phases, one centered on addition and subtraction (e.g., solving $x + q = r$) in relation to rational number addition and subtraction (7.NS.A.1) and another centered on multiplication and division (e.g., solving $px + q = r$ and $p(x + q) = r$) in relation to rational number multiplication and division (7.NS.A.2).

EXAMPLES OF OPPORTUNITIES FOR CONNECTIONS AMONG STANDARDS, CLUSTERS OR DOMAINS

This section highlights opportunities for connecting content in assessments, as well as in curriculum and instruction. Examples of connections are highlighted to stress the need to avoid approaching the standards as merely a checklist.

- Students use proportional reasoning when they analyze scale drawings (7.G.A.1).
- Students use proportional reasoning and percentages when they extrapolate from random samples and use probability (7.SP.C.6, 8).