Louisiana STUDENT STANDARDS MATHEMATICS

MATH — MATHEMATICS | 4 — 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 4

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

4.OA.A	■	Use the four operations with whole numbers to solve problems.
4.OA.B	☐	Gain familiarity with factors and multiples.
4.OA.C	○	Generate and analyze patterns.
4.NBT.A	■	Generalize place value understanding for multi-digit whole numbers.
4.NBT.B	■	Use place value understanding and properties of operations to perform multi-digit arithmetic.
4.NF.A	■	Extend understanding of fraction equivalence and ordering.
4.NF.B	■	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.
4.NF.C	■	Understand decimal notation for fractions, and compare decimal fractions.
4.MD.A	☐	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.
4.MD.B	☐	Represent and interpret data.
4.MD.C	○	Geometric measurement: understand concepts of angle and measure angles.
4.MD.D	☐	Relate area to operations of multiplication and addition.
4.G.A	○	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.

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

REQUIRED FLUENCIES FOR GRADE 4

4.NBT.B.4	Add/subtract within 1,000,000

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 3 TO GRADE 4

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 3, students studied multiplication in terms of equal groups, arrays and area. In grade 4, students extend their concept of multiplication to make multiplicative comparisons (4.OA.A.1).[1]
- Students in grade 4 apply and extend their understanding of the meanings and properties of addition and subtraction of whole numbers to extend addition and subtraction to fractions (4.NF.B.3).[2]
- Fraction equivalence is an important theme within the standards that begins in grade 3. In grade 4, students extend their understanding of fraction equivalence to the general case, $a/b = {}^{(n \times a)}/_{(n \times b)}$ (3.NF.A.3 ⟶ 4.NF.A.1).[3] They apply this understanding to compare fractions in the general case (3.NF.A.3d ⟶ 4.NF.A.2).
- Students in grade 4 apply and extend their understanding of the meanings and properties of multiplication of whole numbers to multiply a fraction by a whole number (4.NF.B.4).
- Students in grade 4 begin using the four operations to solve word problems involving measurement quantities such as liquid volume, mass and time (4.MD.A.2).
- Students combine their understanding of the meanings and properties of multiplication and division with their understanding of base-ten units to begin to multiply and divide multidigit numbers (4.NBT.B.5–6; this builds on work done in grade 3, cf. 3.NBT.A.3).
- Students generalize their previous understanding of place value for multidigit whole numbers (4.NBT.A.1–3). This supports their work in multidigit multiplication and division, carrying forward into grade 5, when students will extend place value to decimals.

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.

4.NBT.B.4 Fluently add and subtract multi-digit whole numbers with sums less than or equal to 1,000,000, using the standard algorithm.

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.)

- Students' work with decimals (4.NF.C.5–7) depends to some extent on concepts of fraction equivalence and elements of fraction arithmetic. Students express fractions with a denominator of 10 as an equivalent fraction with a denominator of 100; comparisons of decimals require that students use similar reasoning to comparisons with fractions.
- Standard 4.MD.A.2 refers to using the four operations to solve word problems involving measurement quantities such as liquid volume, mass, time, and so on. Some parts of this standard could be met earlier in the year (such as using whole-number multiplication to express measurements given in a larger unit in terms of a smaller unit — see also 4.MD.A.1), while others might be met only by the end of the year (such as word problems involving addition and subtraction of fractions or multiplication of a fraction by a whole number — see also 4.NF.B.3d and 4.NF.B.4c).
- Standard 4.MD.C.7 refers to word problems involving unknown angle measures. Before this standard can be met, students must understand concepts of angle measure (4.MD.C.5) and, presumably, gain some experience measuring angles (4.MD.C.6). Before that can happen, students must have some familiarity with the geometric terms that are used to define angles as geometric shapes (4.G.A.1).

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.

- The work that students do with units of measure (4.MD.A.1–2) and with multiplication of a fraction by a whole number (4.NF.B.4) can be connected to the idea of "times as much" in multiplication (4.OA.A.1).
- Addition of fractions (4.NF.B.3) and concepts of angle measure (4.MD.C.5a, 4.MD.C.5b, and 4.MD.C.7) are connected in that a one-degree measure is a fraction of an entire rotation and that adding angle measures together is adding fractions with a denominator of 360.

1 In an additive comparison problem (grades 1–2), the underlying question is what amount would be added to one quantity to result in the other? In a multiplicative comparison problem, the underlying question is what factor would multiply one quantity to result in the other?

2 This work is limited to equal denominators in grade 4 to give students more time to build their understanding of fraction equivalence, before adding and subtracting unlike denominators in grade 5.

3 Students who can generate equivalent fractions can also develop strategies for adding fractions with different denominators, but this is not a requirement in grade 4.