Louisiana STUDENT STANDARDS MATHEMATICS

Grade 5

Louisiana Student Standards: Companion Document for Teachers 2.0

This document is designed to assist educators in interpreting and implementing Louisiana's new mathematics standards. It contains descriptions of each grade 5 math standard to answer questions about the standard's meaning and how it applies to student knowledge and performance. Version 2.0 has been updated to include information from LDOE's Grade 5 Remediation and Rigor documents. Some examples have been added, deleted or revised to better reflect the intent of the standard. Examples are samples only and should not be considered an exhaustive list.

This companion document is considered a "living" document as we believe that teachers and other educators will find ways to improve the document as they use it. Please send feedback to LouisianaStandards@la.gov so that we may use your input when updating this guide.

Additional information on the Louisiana Student Standards for Mathematics, including how to read the standards' codes, a listing of standards for each grade or course, and links to additional resources, is available at http://www.louisianabelieves.com/resources/library/k-12-math-year-long-planning.

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DEPARTMENT of EDUCATION
Louisiana Believes

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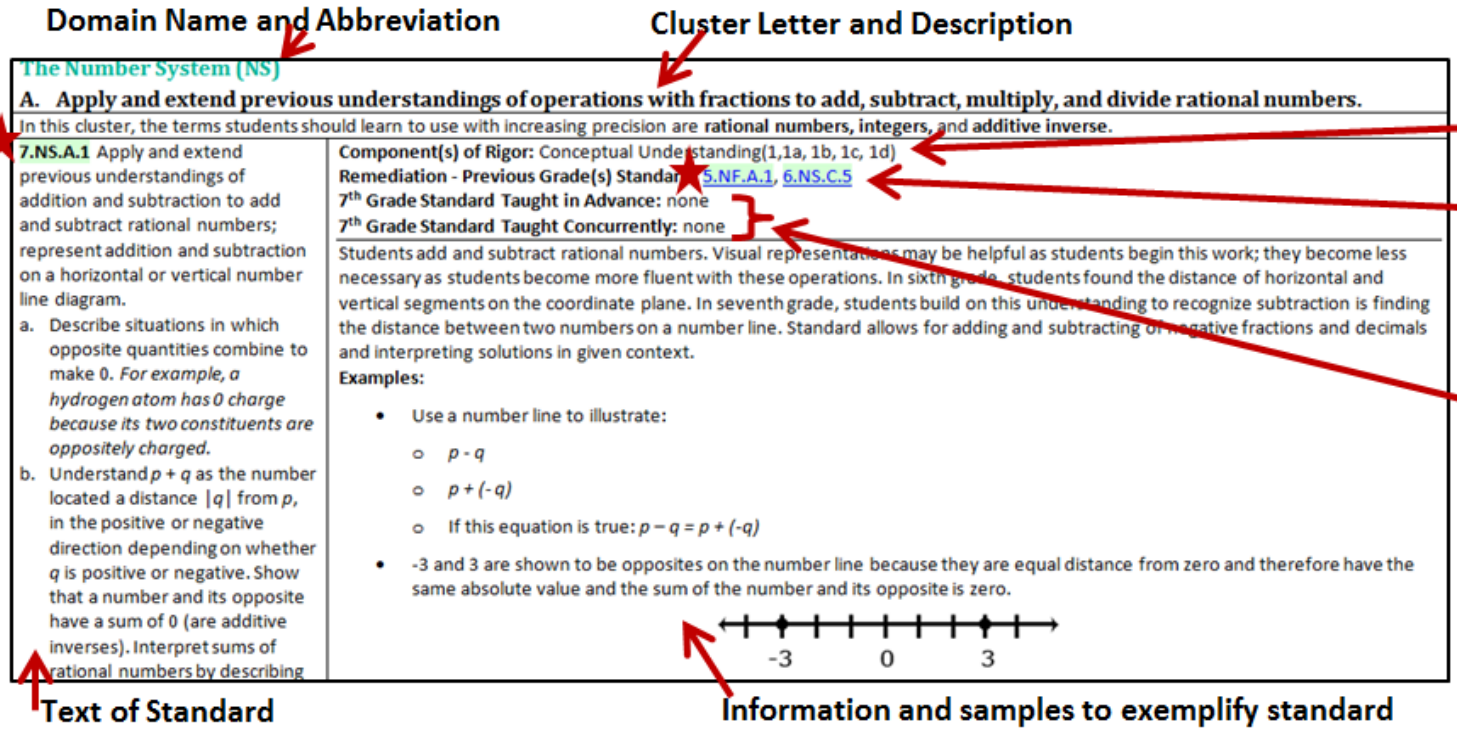
How-to-Read Guide

The diagram below provides an overview of the information found in all companion documents. Definitions and more complete descriptions are provided on the next page.



★ Shading of Standard Codes: Major Work of Grade, Supporting Work, Additional Work

Codes for previous grade standards and standards taught prior to or with this standard are hyperlinked to the text of the standard.

1. **Domain Name and Abbreviation:** A grouping of standards consisting of related content that are further divided into clusters. Each domain has a unique abbreviation and is provided in parentheses beside the domain name.
2. **Cluster Letter and Description:** Each cluster within a domain begins with a letter. The description provides a general overview of the focus of the standards in the cluster.
3. **Previous Grade(s) Standards:** One or more standards that students should have mastered in previous grades to prepare them for the current grade standard. If students lack the pre-requisite knowledge and remediation is required, the previous grade standards provide a starting point.
4. **Standards Taught in Advance:** These current grade standards include skills or concepts on which the target standard is built. These standards are best taught before the target standard.
5. **Standards Taught Concurrently:** Standards which should be taught with the target standard to provide coherence and connectedness in instruction.
6. **Component(s) of Rigor:** See full explanation on components of rigor below.
7. **Sample Problem:** The sample provides an example how a student might meet the requirements of the standard. Multiple examples are provided for some standards. However, sample problems should not be considered an exhaustive list. Explanations, when appropriate, are also included.
8. **Text of Standard:** The complete text of the targeted Louisiana Student Standards of Mathematics is provided.

Classification of Major, Supporting, and Additional Work

Students should spend the large majority of their time on the major work of the grade. Supporting work and, where appropriate, additional work can engage students in the major work of the grade. Each standard is color-coded to quickly and simply determine how class time should be allocated. Furthermore, standards from previous grades that provide foundational skills for current grade standards are also color-coded to show whether those standards are classified as major, supporting, or additional in their respective grades.

Components of Rigor

The K-12 mathematics standards lay the foundation that allows students to become mathematically proficient by focusing on conceptual understanding, procedural skill and fluency, and application.

Conceptual Understanding refers to understanding mathematical concepts, operations, and relations. It is more than knowing isolated facts and methods. Students should be able to make sense of why a mathematical idea is important and the kinds of contexts in which it is useful. It also allows students to connect prior knowledge to new ideas and concepts.

Procedural Skill and Fluency is the ability to apply procedures accurately, efficiently, and flexibly. It requires speed and accuracy in calculation while giving students opportunities to practice basic skills. Students' ability to solve more complex application tasks is dependent on procedural skill and fluency.

Application provides a valuable content for learning and the opportunity to solve problems in a relevant and a meaningful way. It is through real-world application that students learn to select an efficient method to find a solution, determine whether the solution makes sense by reasoning, and develop critical thinking skills.

Standards for Mathematical Practices

The Louisiana Standards for Mathematical Practice are expected to be integrated into every mathematics lesson for all students in grades K-12. Below are a few examples of how these practices may be integrated into tasks that students in Grade 5 complete.

Louisiana Standards for Mathematical Practice (MP)	
Louisiana Standard	**Explanations and Examples**
5.MP.1 Make sense of problems and persevere in solving them.	Students solve problems by applying their understanding of operations with whole numbers, decimals, and fractions including mixed numbers. They solve problems related to volume and measurement conversions. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?".
5.MP.2 Reason abstractly and quantitatively.	Fifth graders should recognize that a number represents a specific quantity. They connect quantities to written symbols and create a logical representation of the problem at hand, considering both the appropriate units involved and the meaning of quantities. They extend this understanding from whole numbers to their work with fractions and decimals. Students write simple expressions that record calculations with numbers and represent or round numbers using place value concepts.
5.MP.3 Construct viable arguments and critique the reasoning of others.	In fifth grade, students may construct arguments using concrete referents, such as objects, pictures, and drawings. They explain calculations based upon models and properties of operations and rules that generate patterns. They demonstrate and explain the relationship between volume and multiplication. They refine their mathematical communication skills as they participate in mathematical discussions involving questions like "How did you get that?" and "Why is that true?" They explain their thinking to others and respond to others' thinking.
5.MP.4 Model with mathematics.	Students experiment with representing problem situations in multiple ways including numbers, words (mathematical language), drawing pictures, using objects, making a chart, list, or graph, creating equations, etc. Students need opportunities to connect the different representations and explain the connections. They should be able to use all of these representations as needed. Fifth graders should evaluate their results in the context of the situation and whether the results make sense. They also evaluate the utility of models to determine which models are most useful and efficient to solve problems.

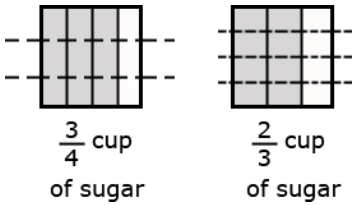
5.MP.5 Use appropriate tools strategically.	Fifth graders consider the available tools (including estimation) when solving a mathematical problem and decide when certain tools might be helpful. For instance, they may use unit cubes to fill a rectangular prism and then use a ruler to measure the dimensions. They use graph paper to accurately create graphs and solve problems or make predictions from real-world data.
5.MP.6 Attend to precision.	Students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Students use appropriate terminology when referring to expressions, fractions, geometric figures, and coordinate grids. They are careful about specifying units of measure and state the meaning of the symbols they choose. For instance, when figuring out the volume of a rectangular prism they record their answers in cubic units.
5.MP.7 Look for and make use of structure.	In fifth grade, students look closely to discover a pattern or structure. For instance, students use properties of operations as strategies to add, subtract, multiply and divide with whole numbers, fractions, and decimals. They examine numerical patterns and relate them to a rule or a graphical representation.
5.MP.8 Look for and express regularity in repeated reasoning.	Fifth graders use repeated reasoning to understand algorithms and make generalizations about patterns. Students connect place value and their prior work with operations to understand algorithms to fluently multiply multi-digit numbers and perform all operations with decimals to hundredths. Students explore operations with fractions with visual models and begin to formulate generalizations.

Number and Operations—Fractions (NF)

A. Use equivalent fractions as a strategy to add and subtract fractions.

In this cluster, the terms students should learn to use with increasing precision are **fraction, equivalent, sum, difference, unlike denominator, numerator, benchmark fraction, estimate, reasonableness,** and **mixed number**.

Louisiana Standard	Explanations and Examples
5.NF.A.1 Add and subtract fractions with unlike denominators (including mixed numbers) by replacing given fractions with equivalent fractions in such a way as to produce an equivalent sum or difference of fractions with like denominators. *For example, $2/3 + 5/4 = 8/12 + 15/12 = 23/12$. (In general, $a/b + c/d = (ad + bc)/bd$.)*	**Component(s) of Rigor:** Conceptual Understanding, Procedural Skill and Fluency **Remediation - Previous Grade(s) Standard: 4.NF.A.1, 4.NF.B.3** **5th Grade Standard Taught in Advance:** none **5th Grade Standard Taught Concurrently:** none Students should apply their understanding of equivalent fractions developed in fourth grade and their ability to rewrite fractions in an equivalent form to find common denominators. This process should come after students have used visual fraction models (area models, number lines, etc.) to build understanding. The use of visual fraction models allows students to reason about a common denominator prior to using the algorithm. For example, when adding $\frac{1}{3}+\frac{1}{6}$, grade 5 students should apply their understanding of equivalent fractions and their ability to rewrite fractions in an equivalent form to find common denominators. While simplifying fractional answers is not required, simplifying should be allowed. Example: • $\frac{1}{3}+\frac{1}{6}$  $\frac{1}{3}$ is the same as $\frac{2}{6}$ I drew a rectangle and shaded $\frac{1}{3}$. I knew that if I cut every third in half then I would have sixths. Based on my picture, $\frac{1}{3}$ equals $\frac{2}{6}$. Then I shaded in another $\frac{1}{6}$ with a different color. I ended up with an answer of $\frac{3}{6}$, which is equal to $\frac{1}{2}$. Based on the algorithm in the standard, when solving $\frac{1}{3}+\frac{1}{6}$, multiplying 3 and 6 gives a common denominator of 18. Students would make equivalent fractions $\frac{6}{18}+\frac{3}{18}=\frac{9}{18}$ which is also equal to one-half. **Teacher Note**: While multiplying the denominators will always give a common denominator, this may not result in the smallest denominator.

5.NF.A.1 *continued*	Students should apply their understanding of equivalent fractions and their ability to rewrite fractions in an equivalent form to find common denominators. They should know that multiplying the denominators will always give a common denominator but may not result in the smallest denominator. **Examples**: • $\frac{2}{5}+\frac{7}{8}=\frac{16}{40}+\frac{35}{40}=\frac{51}{40}$ • $3\frac{1}{4}-\frac{1}{6}=3\frac{3}{12}-\frac{2}{12}=3\frac{1}{12}$ or $3\frac{1}{4}-\frac{1}{6}=3\frac{6}{24}-\frac{4}{24}=3\frac{2}{24}$ or $3\frac{1}{12}$
5.NF.A.2 Solve word problems involving addition and subtraction of fractions. a. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. b. Use benchmark fractions and number sense of fractions to estimate mentally and justify the reasonableness of answers. *For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < ½.*	**Component(s) of Rigor:** Conceptual Understanding (2b), Application (2, 2a), **Remediation - Previous Grade(s) Standard:** 4.NF.A.2 **5th Grade Standard Taught in Advance:** 5.NF.A.1 **5th Grade Standard Taught Concurrently:** none This standard is focused on use of number sense in the context of solving word problems Students rely on their understanding of fractions as numbers that lie between whole numbers on a number line. Number sense in fractions also includes moving between decimals and fractions to find equivalents as well as being able to use reasoning such as $\frac{7}{8}$ is greater than $\frac{3}{4}$ because $\frac{7}{8}$ is missing only $\frac{1}{8}$ and $\frac{3}{4}$ is missing $\frac{1}{4}$ so $\frac{7}{8}$ is closer to a whole. Also, 5.NF.A.2b indicates that students should use benchmark fractions to estimate and examine the reasonableness of their answers. **Examples**: • Jerry was making two different types of cookies. One recipe needed $\frac{3}{4}$ cup of sugar and the other needed $\frac{2}{3}$ cup of sugar. How much sugar did he need to make both recipes? Mental estimation: A student may say that Jerry needs more than 1 cup of sugar but less than 2 cups. An explanation may compare both fractions to $\frac{1}{2}$ and state that both are larger than $\frac{1}{2}$ so the total must be more than 1. In addition, both fractions are slightly less than 1 so the sum cannot be more than 2. Area model  $\frac{3}{4}$ cup of sugar $\frac{2}{3}$ cup of sugar $\frac{3}{4}=\frac{9}{12}$ $\frac{2}{3}=\frac{8}{12}$ $\frac{3}{4}+\frac{2}{3}=\frac{17}{12}=\frac{12}{12}+\frac{5}{12}=1\frac{5}{12}$