MA.4.FR.2.2

Overarching Standard: ***MA.4.FR.2*** *Build a foundation of addition, subtraction, and multiplication operations with fractions.*

Benchmark of Focus

MA.4.FR.2.2: Add and subtract fractions with like denominators, including mixed numbers and fractions greater than one, with procedural reliability.

Examples: The difference $\frac{9}{5} - \frac{4}{5}$ can be expressed as $9\ fifths$ minus $4\ fifths$ which is $5\ fifths$ or one.

Benchmark Clarifications

Clarification 1: Instruction includes the use of word form, manipulatives, drawings, the properties of operations or number lines.

Clarification 2: Within this benchmark, the expectation is not to simplify or use lowest terms.

Clarification 3: Denominators are limited to 2, 3, 4, 5, 6, 8, 10, 12, 16 and 100.

Related Benchmark/Horizontal Alignment

- MA.4.AR.1.2

Vertical Alignment

Previous Benchmarks	**Next Benchmarks**
MA.3.FR1.1 MA.3.FR.1.2	MA.5.FR.2.1

Terms from the K-12 Glossary

- Equation
- Expression

Purpose and Instructional Strategies

The purpose of this benchmark is for students to build upon their decomposition of fractions to develop an accurate, reliable method for adding and subtracting fractions with like denominators (including mixed numbers and fractions greater than one) that aligns with their understanding and learning style. Procedural reliability in addition and subtraction of fractions with unlike denominators is expected in Grade 5.

- *Clarification 1* states that instruction should include word form (to build vocabulary), manipulatives and drawings (to model), and the properties of operations. Using properties of operations (e.g., commutative property of addition, associative property of addition) allows students to connect prior knowledge about whole number addition and subtraction to fractions. Properties of operations also allow for students to add and subtract fractions flexibly (e.g., students may add by rewriting the expression $1\frac{4}{5} + 4\frac{3}{5}$ as $1 + 4 + \frac{4}{5} + \frac{3}{5}$ using the associative property of addition)

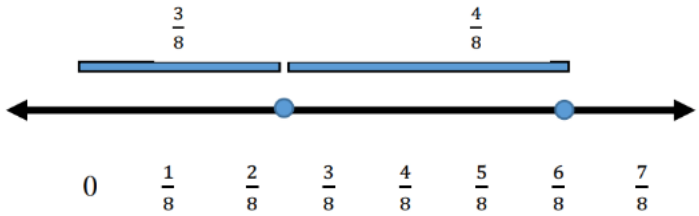
- Students need to have experience regrouping a fraction equivalent to 1 as a whole number for addition and subtraction. For example, $\frac{5}{6}+\frac{4}{6}=\frac{9}{6}=\frac{6}{6}+\frac{6}{6}=1\frac{3}{6}$.
- This benchmark should be taught with MA.4.AR.1.2 for students to solve real-world problems while adding and subtracting fractions.

Common Misconceptions or Errors

- Some students may have difficulty understanding that when adding or subtracting fractions with like denominators, the denominator does not change. To help students understand why this happens, addition and subtraction should be accompanied with models to justify solutions.

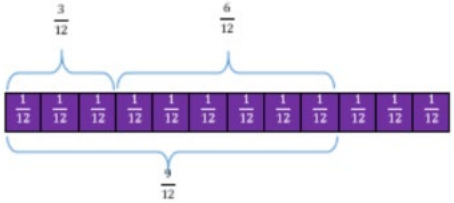
Strategies to Support Tiered Instruction

- Instruction includes models and drawings demonstrating how when adding and subtracting with like denominators, we are adding and subtracting pieces of the whole. This learning connects to the understanding that fractions can be decomposed into smaller fractions from MA.4.FR.2.1.
    - For example, using a number line, the teacher models solving adding on the number line with guided questioning. Students explain how to use the number line as a model to solve the expression $\frac{3}{8}+\frac{4}{8}=?$



$$\frac{3}{8}+\frac{4}{8}=\frac{7}{8}$$

- Instruction includes the use of fraction bars or fraction strips to model solving expressions with explicit instruction and guided questioning.
    - For example, students explain how to use fraction bars or fraction strips as a model to solve expressions.



$$\frac{3}{12}+\frac{6}{12}=\frac{9}{12}$$

Questions to ask students:

- **Ask students to decompose a fraction like 4/3 into a sum of fractions in more than one way.**

- Sample answer that indicates understanding: *1/3 + 1/3 + 1/3 +1/3* ***or*** *2/3 + 2/3* ***or*** *1/3 + 3/3* ***or*** *2/3 + 1/3 + 1/3 including the rearrangement of the addends.*
- Sample answer that indicates an incomplete understanding or a misconception: *An incomplete or inaccurate list of number sentences.*

- **Ask students to explain and/or model how to find the difference between two fractions or mixed numbers like 2 3/4 – 1 2/4.**
  - Sample answer that indicates understanding: *Student can use fraction strips, number lines, drawings, or words to describe the process of subtracting both whole and fourths to arrive at a difference of 1 1/4.*

- **When would renaming a mixed number into fractions greater than one make the problem easier to solve?**
  - Sample answer that indicates understanding: *Student should be able to share with you an example of an expression where renaming would help to find the sum or difference such as: 2 and 3/10 – 1 and 7/10 and one where renaming is not needed such as: 1 and 3/4 – 1 and 1/4.*

- **When you add two fractions with same denominator why does the sum also have the same denominator?**
  - Sample answer that indicates understanding: *The denominator names the unit or the size of the pieces. The size of the pieces does not change when you add them.*
  - Sample answer that indicates an incomplete understanding: *They just always stay the same or my teacher told me that they always stay the same.*

Instructional Tasks

Instructional Task 1

Find the sum and explain your method

a. $\frac{3}{4} + 2\frac{3}{4} =$

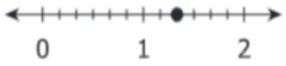
b. $2\frac{3}{10} + 1\frac{4}{10} =$

c. $2\frac{5}{8} - 1\frac{3}{8} =$

Instructional Items

Instructional Item 1

The point on a number line shows the value of the sum of two fractions.



Which expression has that sum?

a. $\frac{4}{3}+\frac{4}{3}$

b. $\frac{6}{4}+\frac{2}{4}$

c. $\frac{5}{6}+\frac{3}{6}$

d. $\frac{2}{12}+\frac{6}{12}$

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.4.FR.2.2 Add and subtract fractions with like denominators, including mixed numbers and fractions greater than one, with procedural reliability. Example: The difference $\frac{9}{5}-\frac{4}{5}$ can be expressed as 9 fifths minus 4 fifths which is 5 fifths, or one.	Mathematical	N/A

ALD 2	ALD 3	ALD 4	ALD 5
adds and subtracts fractions with like denominators, limited to 2, 3, 4, 5, 6, 8, and 10, when given models.	adds and subtracts fractions with like denominators, including fractions greater than one, with procedural reliability.	adds and subtracts fractions with like denominators, including mixed numbers and fractions greater than one, with procedural reliability.	identifies an error and adds and subtracts fractions with like denominators, including mixed numbers and fractions greater than one, with procedural reliability.

Additional Resources:

CPALMS Resources

Khan Academy: Adding Fractions with like Denominators (simplifying the fraction is not expected in this benchmark)

Khan Academy: Subtracting Fractions with like Denominators (simplifying the fraction is not expected in this benchmark)

Khan Academy: Adding Mixed Numbers (simplifying the fraction is not expected in this benchmark)

Khan Academy Subtracting Mixed Numbers (simplifying the fraction is not expected in this benchmark)

Resources/Tasks to Support Your Child at Home:

- Find fractions in magazines or recipes and have your child decompose them as many different ways as they can. *For example: 1 3/4 can be broken down to* 4/4 + 3/4 *or* 1/4 + 1/4 + 1/4 + 1/4 + 1/4 + 1/4+ ¼
- Get cooking! Involve your child in helping with following a recipe using fractions. Before they combine dry ingredients, such as three-fourths cup of flour and one-fourth cup of sugar, ask them to think about how many total cups they will have of dry ingredients.
- Learnzillion – "Decompose fractions into…" https://goo.gl/S1P9X9
- Learnzillion- "Add and subtract fractions…" https://goo.gl/9mHnM8
- Khan Academy Practice Addition and Subtraction Word Problems (like denominators) – https://goo.gl/pkgArS