MA.4.AR.1.2

Overarching Standard: *MA.4.AR.1*

Represent and solve problems involving the four operations with whole numbers and fractions.

Benchmark of Focus

MA.4.AR.1.2: Solve real-world problems involving addition and subtraction of fractions with like denominators, including mixed numbers and fractions greater than one.

> *Examples:* Megan is making pies and uses the equation $1\frac{3}{4} + 3\frac{1}{4} = x$ when baking. Describe a situation that can represent this equation.

> *Examples:* Clay is running a 10K race. So far, he has run $6\frac{1}{5}$ kilometers. How many kilometers does he have remaining?

Benchmark Clarifications

Clarification 1: Problems include creating real-world situations based on an equation or representing a real-world problem with a visual model or equation.

Clarification 2: Fractions within problems must reference the same whole.

Clarification 3: Within this benchmark, the expectation is not to simplify or use lowest terms.

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

Related Benchmark/Horizontal Alignment
- MA.4.FR.1.3
- MA.4.FR.2.2
- MA.4.M.2.1
- MA.4.DP.1.3

Vertical Alignment

Previous Benchmarks	Next Benchmarks
MA.3.FR.1.2	MA.5.AR.1.2

Terms from the K-12 Glossary
- Equation

Purpose and Instructional Strategies
The purpose of this benchmark is to connect procedures for adding and subtracting fractions with like denominators (MA.4.FR.2.2) to real world situations. This builds on composing and decomposing fractions (MA.4.FR.2.1) to connect to addition and subtraction of fractions.
- Instruction should include providing students with the opportunity to recognize models or equations based on a real-world situation.

- Models may include fraction bars, fraction circles and relationship rods.
- Instruction should include allowing students to create world situations based on models or equations.
- Instruction should include having students connect adding and subtracting procedures to real-world situations.

Common Misconceptions or Errors
- Students tend to have trouble with addition and subtraction because much instruction focuses only on procedures. Students need to know how to treat the numerator and denominator when following the procedures to add and subtract. It is important for students to use models so they make sense of equations and real-world problems when they solve them.

Strategies to Support Tiered Instruction
- Instruction includes opportunities to engage in teacher-directed practice using visual representations to solve real-world problems involving addition and subtraction of fractions with like denominators. Students use models or equations based on real-world situations with an emphasis on how to treat the numerator and denominator when adding and subtracting.
  - For example, the teacher displays and reads the following problem: "Sara read $\frac{2}{8}$ of her book on Friday. On Saturday, she read $\frac{3}{8}$ of her book. How much of her book did she read on both days combined?" Using a number line, the teacher models solving this problem with explicit instruction and guided questioning. Students explain how to use the number line as a model to solve this question. Have students use an equation to represent the problem. This is repeated with similar real-world problems.

$$\frac{2}{8} + \frac{3}{8} = \frac{5}{8}$$
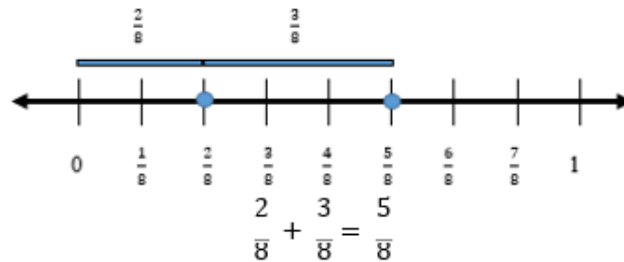
  - For example, the teacher displays and reads the following problem: "Jamal has a raised bed garden in his backyard. He planted tomatoes in $\frac{5}{12}$ of his garden and zucchini in $\frac{3}{12}$ of his garden. What fraction of his garden contains tomatoes and zucchini?" Using fraction bars or fraction strips, the teacher models solving this problem with explicit instruction and guided questioning. Students explain how to use fraction bars or fraction strips as a model to solve this question and create an equation to represent the problem. This is repeated with similar real-world problems.

$$\frac{5}{12} + \frac{3}{12} = \frac{8}{12}$$
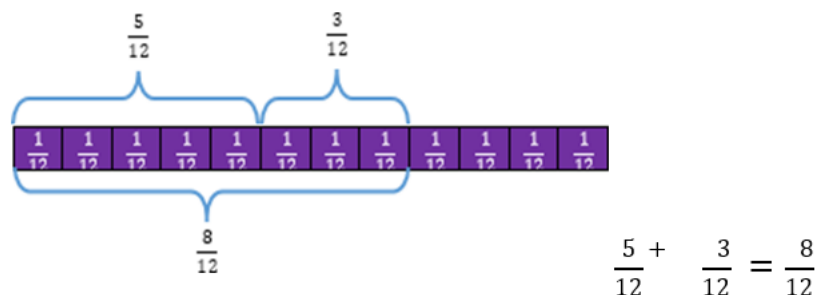
Questions to ask students:

- **Ask students to explain and/or model how to find the difference between two fractions or mixed numbers like $2\frac{3}{4} - 1\frac{2}{4}$.**
- 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 $1\frac{1}{4}$

- **When you add two fractions with the 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.

Instructional Tasks
Instructional Task 1

Solve the following problem. Anna Marie has $\frac{3}{4}$ of a medium cheese pizza. Kent gives her $\frac{3}{4}$ of a medium pepperoni pizza. How much pizza does Anna Marie have now?

Explain how this problem cannot be solved by adding $\frac{5}{8}$ and $\frac{4}{8}$:

Anna Maria has $\frac{5}{8}$ of a medium pizza. Kent gives her $\frac{4}{8}$ of a large pizza. How much pizza does Anna Marie have now?

Instructional Items
Instructional Item 1

Jose was completing an exercise program. $\frac{8}{12}$ of the exercise program was sit-ups. The rest of the exercise program was pull-ups. What fraction of the exercise program was pull-ups?

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.4.AR.1.2 Solve real-world problems involving addition and subtraction of fractions with like denominators, including mixed numbers and fractions greater than one. Example: Megan is making pies and uses the equation $1\frac{3}{4} + 3\frac{1}{4} = x$ when baking. Describe a situation that can represent this equation. Example: Clay is running a 10K race. So far, he has run $6\frac{1}{5}$ kilometers. How many kilometers does he have remaining?	Real-World	N/A

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ALD 2	ALD 3	ALD 4	ALD 5
solves one-step real-world problems involving addition and subtraction of fractions with like denominators, limited to 2, 3, 4, 5, 6, 8, and 10.	solves real-world problems involving addition and subtraction of fractions with like denominators, including fractions greater than one.	solves real-world problems involving addition and subtraction of fractions with like denominators, including mixed numbers and fractions greater than one.	solves multi-step real-world problems involving addition and subtraction of fractions with like denominators, including mixed numbers and fractions greater than one; creates a real-world situation based on an equation including a variable to represent the unknown.

Additional Resources:
CPALMS Resources: https://www.cpalms.org/PreviewStandard/Preview/15362

Khan Academy: Khan Academy Practice Addition and Subtraction Word Problems (like denominators) - https://goo.gl/pkgArS

Resources/Tasks to Support Your Child at Home:

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.

- Play Fruit Splat Fraction Addition: https://goo.gl/F7FWzB
- Math Man is a "Pac-man" style game. Practice adding and subtracting fractions with like denominators: https://goo.gl/Hgsuap