MA.5.AR.1.3

Overarching Standard: *MA.5.AR.1 Solve problems involving the four operations with whole numbers and fractions.*

Benchmark of Focus

MA.5.AR.1.3: Solve real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction.

Examples: Shanice had a sleepover and her mom is making French toast in the morning. If her mom had $2\frac{1}{4}$ loaves of bread and used $1\frac{1}{2}$ loaves for the French toast, how much bread does she have left?

Benchmark Clarifications

Clarification 1: Instruction includes the use of visual models and equations to represent the problem.

Related Benchmark/Horizontal Alignment
- MA.5.NSO.2.2
- MA.5.FR.2.4

Vertical Alignment

| Previous Benchmarks	Next Benchmarks
MA.4.AR.1.3	MA.6.NSO.2.3

Terms from the K-12 Glossary
- (delete if none)
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Purpose and Instructional Strategies

The purpose of this benchmark is to connect division of fraction concepts to real-world scenarios (K12.MTR.7.1). This work builds on the multiplication of fractions by whole numbers in Grade 4 (MA.4.AR.1.3), and prepares them for Grade 6 (MA.6.NSO.2.3) where they will solve real- world fraction problems using all four operations with fractions (MTR.7.1).
- During instruction, it is important for students to have opportunities to extend their understanding of the meaning of fractions, how many unit fractions are in a whole, andtheir understanding of division of fractions as involving equal groups or shares and thenumber of objects in each.
- Students should use visual fraction models and reasoning to solve word problems involving division of fractions. For example, to assist students with solving the problem, "The elephant eats 4 lbs. of peanuts a day. His trainer gives him $\frac{1}{5}$ of a pound at a time. How many times a day does the elephant eat peanuts?" use the following diagram to show how $4 \div \frac{1}{5}$ can be visualized to assist students with solving.

1 lb. of peanuts

$\frac{1}{5}$ lb.
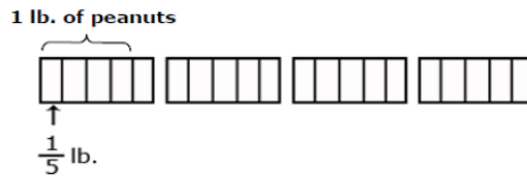
- The expectation of this benchmark is not for students to use an algorithm (e.g., multiplicative inverse) to divide fractions.

- Instruction includes students using equivalent fractions to simplify answers; however,putting answers in simplest form is not a priority.

Common Misconceptions or Errors
- Students may believe that division always results in a smaller number, which is true when dividing a fraction by a whole number, but not when dividing a whole number by a fraction. Using models will help students develop the understanding needed for computation with fractions.

Questions to ask students:

- Is it always, sometimes, or never true that you divide a bigger number by a smaller number? Explain.
- Sample answer that indicates understanding: This is sometimes true because when dividing a fraction by a whole number, like dividing $\frac{1}{2}$ by 3, results in a quotient of $\frac{1}{6}$ so it depends on the situation. If the situation is about dividing 12 muffins among 3 people, each person will get 4 muffins. In that case, we divided the greater number by a smaller number.
- Sample answer that indicates an incomplete understanding or a misconception: It is always true that you divide a bigger number by a smaller number because that's what I learned about division before.

- How do you know that the equation you wrote matches this word problem?
- Sample answer that indicates understanding: The student is able to explain how the model or picture made matches the problem and understands the division of a unit fraction by a whole number.
- Sample answer that indicates an incomplete understanding or a misconception: The student is unable to adequately explain how the model or picture matches the division problem.

- How can you check your work to explain why $\frac{1}{2}$ divided by 3 equals $\frac{1}{6}$?
- Sample answer that indicates understanding: Sample answer that indicates understanding: I know that $\frac{1}{2} \div 3 = \frac{1}{6}$ because $3 \times \frac{1}{6} = \frac{1}{2}$. Multiplication is the inverse of division.

Instructional Tasks
Instructional Task 1
Sonya has $\frac{1}{2}$ gallon of chocolate chip ice cream. She wants to share her ice cream with 6 friends. How much ice cream will each friend get?

Instructional Items
Instructional Item 1
Betty has 12 sheets of tissue paper to add to her holiday gift bags. Each gift bag needs $\frac{1}{3}$ sheet of tissue paper. How many holiday gift bags can Betty fill?

Achievement Level Descriptors:

Benchmark	Context	Assessment Limits
MA.5.AR.1.3 Solve real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction. Example: A property has a total of $\frac{1}{2}$, acre and needs to be divided equally among 3 sisters. Each sister will receive $\frac{1}{6}$, of an acre. Example: Kiki has 10 candy bars and plans to give $\frac{1}{4}$, of a candy bar to her classmates at school. How many classmates will receive a piece of a candy bar? Clarification 1: Instruction includes the use of visual models and equations to represent the problem.	Real-world	Unit fractions will have denominators limited to 1–10, 12, 16, 20, 50, and 100.

| ALD 2	ALD 3	ALD 4	ALD 5
Solves real-world problems involving division of a whole number by a unit fraction using models.	Solves real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction using models.	Solves real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction.	Identifies an error and solves real-world problems involving division of a unit fraction by a whole number and a whole number by a unit fraction with an equation.

Additional Resources:
CPALMS Resources

Learn Zillion: Divide a unit fraction by a whole number

Resources/Tasks to Support Your Child at Home:

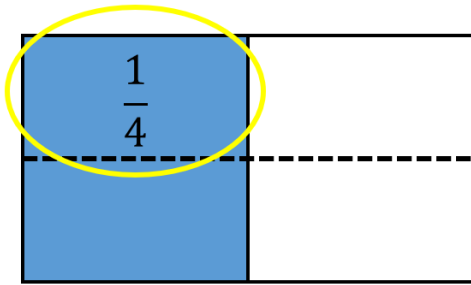Learn Zillion: Draw pictures for division of unit fractions

- Abigail has 1/2 gallon of orange juice. She pours the same amount of the juice into each of 6 glasses. Write an equation to represent the fraction of a gallon of orange juice in each glass.

$$\frac{1}{2} \div 6 = \frac{1}{12}$$
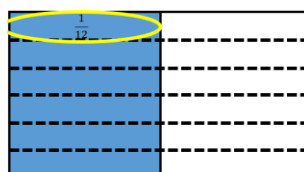
- Divide $\frac{1}{2}$ of a sandwich among 2 people or share $\frac{1}{3}$ quart of milk with 4 friends. Ask how much each person will get. Draw models to support thinking.

$\frac{1}{2} \div 2 = \frac{1}{4}$ sandwich

$\frac{1}{3} \div 4 = \frac{1}{12}$ quart of milk

$$\frac{1}{4}$$

$$\frac{1}{12}$$