MA.3.FR.1.2

Overarching Standard: MA.3.FR.1 *Understand fractions as numbers and represent fractions.*

Benchmark of Focus

MA.3.FR.1.2: Represent and interpret fractions, including fractions greater than one, in the form $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself *m* times.

Example: $\frac{9}{8}$ can be represented as $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}$.

Benchmark Clarifications:

Clarification 1: Instruction emphasizes conceptual understanding through the use of manipulatives or visual models, including circle graphs, to represent fractions.

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

Related Benchmark/Horizontal Alignment

- MA.3.FR.1.1
- MA.3.FR.1.3
- MA.3.FR.2.1
- MA.3.FR.2.2

Vertical Alignment

Previous Benchmarks	Next Benchmarks
MA.2.FR.1.1	MA.4.FR.2.1
MA.2.FR.1.2	MA.4.FR.2.2

Terms from the K-12 Glossary

- Number line

Purpose and Instructional Strategies

The purpose of this benchmark is for students to think conceptually about fractions as they plot, compare, order and determine equivalence in Grade 3. It also allows students to develop the counting strategies and additive reasoning required to add and subtract fractions in Grade 4 (K12.MTR.2.1, K12.MTR.5.1).

- During instruction, teachers should have students practice representing fractions using manipulatives (e.g., fraction strips, circles, relationship rods), visual area models (e.g., partitioned shapes) and on a number line. Manipulatives, visual models and number linesmust extend beyond 1 so that students can represent fractions greater than one (MTR.2.1, MTR.5.1).
- In instruction of MA.3.FR.1.1, students learn that unit fractions are the foundation for all fractions. MA.3.FR.1.2 builds understanding that all fractions, including fractions equal to and greater than one, decompose as the sum of unit fractions.
- In understanding fractions are numbers, students make connections about whole number

operations that will allow them to perform operations with fractions in later grades. For example, understanding fractions as numbers allows students to reason that $\frac{2}{3} + \frac{2}{3} = \frac{4}{3}$ in Grade 4 because we are adding together a total of 4 parts that are each one-third in size (MTR.5.1).

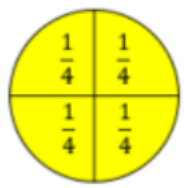
Common Misconceptions or Errors

- Students can misconceive that fractions equal to and greater than 1 can also be represented as the sum of unit fractions (e.g., $\frac{5}{2} = \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2} + \frac{1}{2}$). Flexible representations of models (e.g., rectangular area models that align with number lines) help students connect understanding of fractions and how they are decomposed into unit fractions.

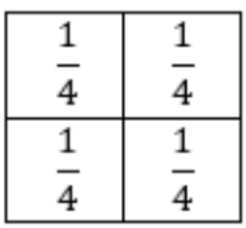
Strategies to Support Tiered Instruction

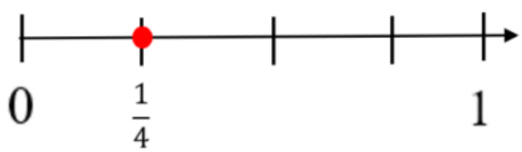
- Instruction includes modeling how fractions are decomposed. Using fraction circles, students build $\frac{4}{4}$ and then see that there are 4 pieces that make up the whole circle.
  - Example:

$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{4}{4}$$

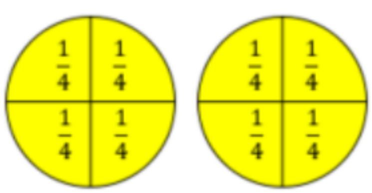


- Instruction includes more than one model so that students can experience and connect fractions in multiple ways. Flexible representations of models (e.g., rectangular area models that align with number lines) help students connect understanding of fractions and how they are decomposed into unit fractions.
  - Example:





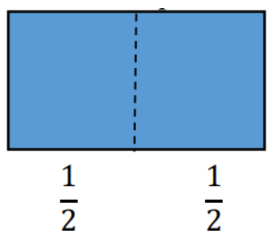
  Students then apply this understanding to fractions greater than one. Using fraction circles, students build $\frac{8}{4}$ and then see that there are 8 pieces that make up two whole circles.
  - Example:



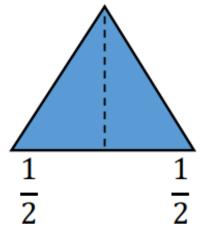
$$\frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{8}{4}$$

- Instruction includes folding and/or cutting pre-made shapes into halves. Students physically bend the paper into halves and then label the pieces. Instruction includes relating the pieces back to the numerator and denominator and then connecting it to the equation. Using multiple shapes with the same denominators will solidify basic fraction understanding. Instruction should progress with other denominators.

- Example:



$\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$



$\frac{1}{2} + \frac{1}{2} = \frac{2}{2}$

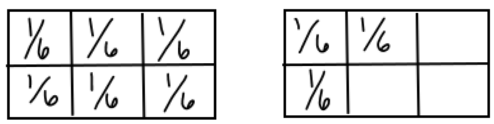
Questions to ask students:

Ask students to model $\frac{5}{8}$ using fraction tiles and record the amount as the sum of unit fractions.

- *Sample answer that indicates understanding:* students write $\frac{5}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$.

Ask students to represent $\frac{9}{6}$ as a visual fraction model and label each part with the unit fraction.

- *Sample answer that indicates understanding:* students draw rectangular models to represent $\frac{9}{6}$ and label 9 of the parts with the fraction $\frac{1}{6}$.



- *Sample answer that indicates a misconception:* students draw one rectangle split into 9 equal parts and label each part with the fraction $\frac{1}{6}$.

Have students represent $\frac{6}{5}$ on a number line. Ask them to show how many $\frac{1}{5}$ sized jumps it takes to get to $\frac{6}{5}$.

- *Sample answer that indicates understanding:* students make six jumps from zero to $\frac{6}{5}$ and label them each $\frac{1}{5}$.
- *Sample answer that indicates partial understanding or a misconception:* students make five jumps from one to $\frac{6}{5}$ and label them each $\frac{1}{5}$.

Instructional Tasks

Instructional Task 1

Part A. How many one-fifth sized parts are added together to equal 1 whole? Prove your thinking with a
visual model or number line.

Part B. How many one-fifth sized parts are added together to equal 2 wholes? Prove your thinking with
a visual model or number line.

Instructional Items

Instructional Item 1

Represent the fraction $\frac{8}{3}$ as the sum of unit fractions.

Instructional Item 2

Which of the following expressions models $\frac{7}{4}$?

a. $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$

b. $\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}$

c. $\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}+\frac{1}{4}$

d. $\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}+\frac{1}{7}$

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.3.FR.1.2 Represent and interpret fractions, including fractions greater than one, in the form of $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself m times. Example: $\frac{9}{8}$ can be represented as $\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}+\frac{1}{8}$. Clarification 1: Instruction emphasizes conceptual understanding through the use of manipulatives or visual models, including circle graphs, to represent fractions. Clarification 2: Denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12.	Both	Fractions must reference the same whole. Items may include models, sets of objects, or number lines. Only whole number marks will be labeled on number lines. Items must not use the term "simplify" or "lowest terms.".

ALD 2	ALD 3	ALD 4	ALD 5
represents fractions in the form of $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself m times using a visual model.	represents and interprets fractions up to one in the form of $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself m times.	represents and interprets fractions, including fractions greater than one, in the form of $\frac{m}{n}$ as the result of adding the unit fraction $\frac{1}{n}$ to itself m times.	N/A

Additional Resources:

[CPALMS Resources]

Video: [Interpreting fractions as measures or numbers]

Resources/Tasks to Support Your Child at Home:

Find fractions in magazines or recipes and have your child represent them as an addition expression with unit fractions. *For example: ¾ can be broken down to* ¼ + ¼ + ¼.

Get cooking! Involve your child in helping with following a recipe using fractions. As they measure ingredients, such as two-thirds cup of flour, ask them how many 1/3-sized cups that would be.

Learnzillion: Decompose fractions into unit fractions