MA.3.FR.1.1

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

Benchmark of Focus

MA.3.FR.1.1: Represent and interpret unit fractions in the form $\frac{1}{n}$ as the quantity formed by one part when a whole is partitioned into *n* equal parts.

Examples: $\frac{1}{4}$ can be represented as $\frac{1}{4}$ of a pie (parts of a shape), as 1 out of 4 trees (parts of a set) or as $\frac{1}{4}$ on the number line.

Benchmark Clarifications:

Clarification 1: This benchmark emphasizes conceptual understanding through the use of manipulatives or visual models.

Clarification 2: Instruction focuses on representing a unit fraction as part of a whole, part of a set, a point on a number line, a visual model or in fractional notation.

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

Related Benchmark/Horizontal Alignment

- MA.3.FR.1.2
- 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 understand that unit fractions are the foundation for all fractions. Second, the purpose is for students to understand that fractions are numbers.
This benchmark continues instruction of fractions from Grade 2, where students partitioned circles and rectangles into two, three or four equal-sized parts (MA.2.FR.1.1 and MA.A2.FR.1.1).

- To activate prior knowledge in Grade 3, instruction should:
    - relate how unit fractions build fractions to how whole-number units build whole numbers, and
    - show models with non-equal parts as non-examples (K12.MTR.2.1).

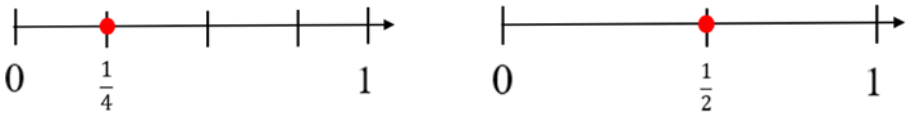
- Unit fractions are defined as one part when a whole is partitioned in any number of equal parts. It is in this benchmark that students conclude that the greater a unit fraction's denominator, the greater its number of parts.
- Instruction should demonstrate how to represent unit fractions using manipulatives (e.g., fraction strips, circles, relationship rods), visual area models (e.g., partitioned shapes), on a number line, and as 1 object in a set of objects (K12.MTR.2.1, K12.MTR.5.1).
- Denominators are limited in Grade 3 to facilitate the visualizing and reasoning required while students plot, compare and identify equivalence in fractions.

Common Misconceptions or Errors

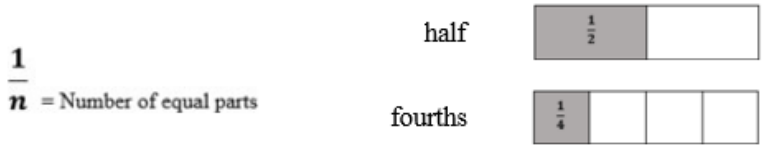
- Students can misconceive the difference between the meaning of numerators and denominators in fractions. For this reason, it is important for teachers and students to represent unit fractions in multiple ways to understand how they relate to a whole. Representations can be modeled together (e.g., fraction strips side-by-side with number lines, or relationship rods side-by-side with number lines) to help build student understanding.
- Students can misconceive that the smaller the denominator, the smaller the piece, or the larger the denominator, the larger the piece. This is due to thinking and reasoning where students worked with whole numbers (the smaller a number, the less it is, or the larger a number, the more it is). To correct this misconception, have students utilize different models, such as fraction bars and number lines, which would provide students opportunities to compare unit fractions and to reason about their sizes.
- Students can misconceive that all shapes can be partitioned the same way. To assist with this misconception, have students practice with presenting shapes other than circles, squares or rectangles to prevent students from over generalizing that all shapes can be divided the same way.

Strategies to Support Tiered Instruction

- Teacher represents unit fractions in multiple ways to show understanding of how they relate to a whole. Representations are modeled together (e.g., fraction strips side-by-side with number lines, or relationship rods side-by-side with number lines) to help build understanding.



- Instruction includes partitioning shapes into different denominators.
    - For example, students compare what they notice about partitioning a rectangle into halves verses fourths. Teacher asks students, "What do you notice about the pieces? How can we write what one piece of the rectangle is worth with a fraction?" Instruction includes the vocabulary of numerator and denominator.



- Instruction includes shapes other than circles and rectangles. Items like pattern blocks allow students to partition shapes like hexagons and rhombi into equal sized pieces. This prevents students from over-generalizing that all shapes can be divided the same way.
- Instruction includes folding and/or cutting premade shapes into different amounts. Students benefit from beginning with halves and fourths, folding the paper in half, and then folding those halves into halves to make fourths.
    - For example, the teacher asks students, "What do you notice about the shapes? About the size? We now have 4 pieces, do we have more than we did before?" Conversation includes the size of the pieces and how that relates to the denominator.

Questions to ask students:

Ask students to identify the numerator and the denominator in a written fraction.

- *Sample answer that indicates understanding:* student points to or verbally states the number above the fraction bar is the numerator and the number below the fraction bar is the denominator.

Point to a numerator in a fraction (such as 1/4) and ask students what the one represents.

- *Sample answer that indicates understanding:* The one lets me know that we "are working with" or "we are describing" 1 piece out of the four pieces it takes to make a whole.
- *Sample answer that indicates incomplete understanding or a misconception:* The one tells us how many pieces will be shaded.

Ask students what the denominator in a fraction describes or tells us about:

- *Sample answer that indicates understanding:* the denominator describes the number of equal pieces it takes to make a whole.

Draw a square split into four Unequal pieces and ask students if this picture shows fourths

- *Sample answer that indicates understanding:* No, because the pieces are not equal. With fractions the same unit pieces always have an equal value.

Instructional Tasks

Instructional Task 1

Terry wants to show the unit fraction $\frac{1}{8}$ using an area model, a number line, and as a set.

Part A. Into how many equal parts should Terry partition his area model? How many of those parts should be shaded? Explain in words.

Part B. Represent $\frac{1}{8}$ using the number line below.

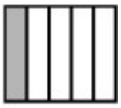
Part C. Draw a model that represents $\frac{1}{8}$ of a set of juice boxes.

Instructional Items

Instructional Item 1

Each model shown has been shaded to represent a fraction. Which model shows $\frac{1}{4}$ shaded?

A. 

C. 

B. 

D. 

Achievement Level Descriptors

Benchmark	Context	Assessment Limits
MA.3.FR.1.1 Represent and interpret unit fractions in the form $\frac{1}{n}$ as the quantity formed by one part when a whole is partitioned into n equal parts. Example: $\frac{1}{4}$ can be represented as $\frac{1}{4}$ of a pie (parts of a shape), as 1 out of 4 trees (parts of a set) or as $\frac{1}{4}$ on the number line. Clarification 1: This benchmark emphasizes conceptual understanding through the use of manipulatives or visual models. Clarification 2: Instruction focuses on representing a unit fraction as part of a whole, part of a set, a point on a number line, a visual model or in fractional notation. Clarification 3: Denominators are limited to 2, 3, 4, 5, 6, 8, 10 and 12	Both	Items must use models, sets of objects, or number lines. Only whole number marks will be labeled on number lines.

ALD 2	ALD 3	ALD 4	ALD 5
represents unit fractions with denominators of 2 to 6 using models and fraction notations.	represents unit fractions with denominators of 2 to 6, 8, and 10 using models and fraction notations.	represents and interprets unit fractions in the form $\frac{1}{n}$ as the quantity formed by one part when a whole is partitioned into n equal parts.	represents and interprets unit fractions in the form $\frac{1}{n}$ as the quantity formed by one part when a whole is partitioned into n equal parts; understands that more equal parts result in smaller units.

Additional Resources:

CPALMS Resources

Video: Interpreting Fractions as Part of a Whole

Video: Introducing Fraction Models

Resources/Tasks to Support Your Child at Home:

Challenge your child to find all the ways to cut/fold a square into fourths.

Discuss fair shares when cutting food to be equally shared by your family. Then describe what fractional amount it was cut into including: halves, thirds, fourths, sixths, eighths.

When eating pizza, discuss the amount eaten by each member of the family. Discuss the importance of the pieces being equal sizes in order to determine the amount each person ate. Then represent the amount with a drawn model.

Ask your child to share a cake with 6 people equally. Ask: How many parts of the cake will 1 person eat? (1/6 of the cake)

Khan Academy: Intro to fractions

Khan Academy: Cutting shapes into equal parts

Khan Academy: Identifying unit fractions word problem

LearnZillion Video: Recognize Fractions – Breaking Shapes into Equal Parts

LearnZillion Video: Write Unit Fractions using Shapes

LearnZillion Video: Write a Fraction to Describe Part of a Set