MA.4.FR.1.1

Overarching Standard: ***MA.4.FR.2*** *Develop an understanding of the relationship between different fractions and the relationship between fractions and decimals.*

Benchmark of Focus

MA.4.FR.1.1: Model and express a fraction, including mixed numbers and fractions greater than one, with the denominator 10 as an equivalent fraction with the denominator 100.

Benchmark Clarifications

Clarification 1: Instruction emphasizes conceptual understanding through the use of manipulatives, visual models, number lines or equations.

Related Benchmark/Horizontal Alignment

- MA.4.NSO.2.6/2.7
- MA.4.FR.2.3

Vertical Alignment

Previous Benchmarks	Next Benchmarks
MA.3.FR.2.2	MA.5.FR.2.1

Purpose and Instructional Strategies

The purpose of this benchmark is to have students begin connecting fractions with decimals. This benchmark will connect fractions and decimals by writing equivalent fractions with denominators of 10 or 100 (decimal fractions). Decimal fractions are defined as fractions with denominators of a power of ten.

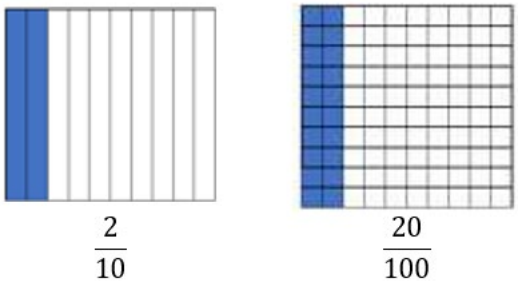
- For students to have a concrete foundation for future work with decimals (MA.4.NSO.1.5, MA.4.FR.1.2, MA.4.FR.1.3), plan experiences that allow students to use 10 x 10 grids, base-ten blocks, and other place value models (MTR.2.1) to explore the relationship between fractions with denominators of 10 and denominators of 100.
- This work lays the foundation for performing decimal addition and subtraction in MA.4.NSO.2.7.

Common Misconceptions or Errors

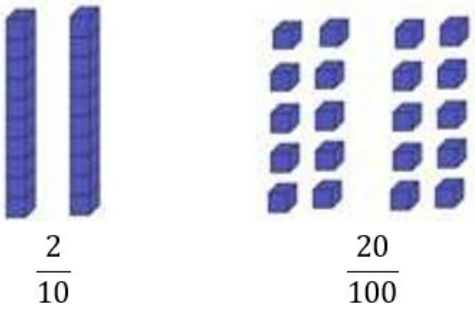
- Students often confuse decimals such as .6 and .06. Students need to have conceptual understanding of the visual representations for tenths and hundredths. Students should use models and explain their reasoning to develop their understanding about the connections between fractions and decimals.

Strategies to Support Tiered Instruction

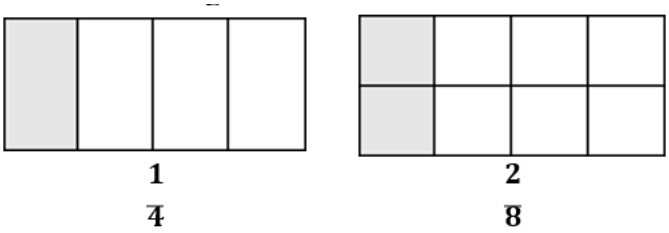
- Instruction includes concrete models and drawings to solidify the conceptual understanding of fraction place value.
    - For example, students create a model for $\frac{2}{10}$. The teacher then asks students to model a fraction that is equivalent with a denominator of 100 and explain what they notice about the models. Conversation involves connections to the value of the fractions.



- Instruction includes building fractions and their equivalents with base ten blocks.
    - For example, students build $\frac{2}{10}$"two-tenths" and $\frac{20}{100}$ "twenty hundredths" with base ten blocks while using vocabulary that will help students see the decimal connection as well. Students will realize that the numbers have the same value.



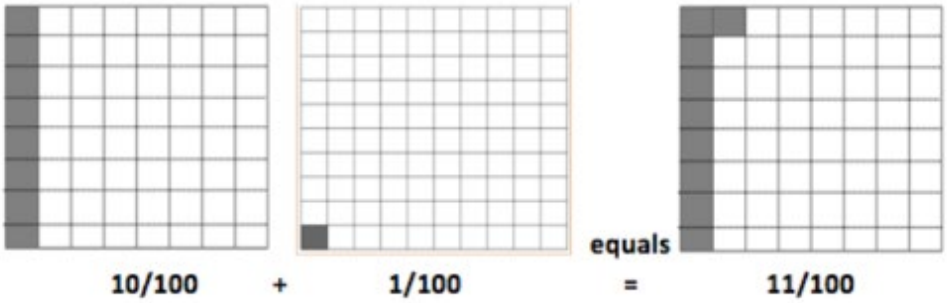
- Instruction includes opportunities to use concrete models and drawings to solidify understanding of fraction equivalence.
    - For example, students use models to describe why fractions are equivalent or not equivalent when referring to the same size whole.



When looking at $\frac{1}{4}$ and $\frac{2}{8}$, discussion includes that both fraction model are the same size. So, when comparing them, we are comparing the same size whole. Students see that 1 out of the 4 are shaded in the first model and 2 out of the 8 are shaded in the second mode, making the $\frac{1}{4}$ equal to $\frac{2}{8}$. Students use this understanding to move into fractions with larger denominators.

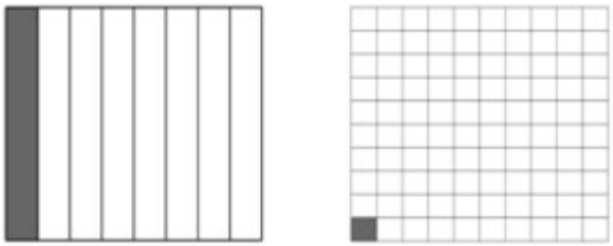
Questions to ask students:

- **What if you combined the 1/10 and 1/100 what would be the new value?**
  - Sample answer that indicates understanding: *Student demonstrates the understanding that 1/10 must be converted to hundredths then added. (model shown below)*



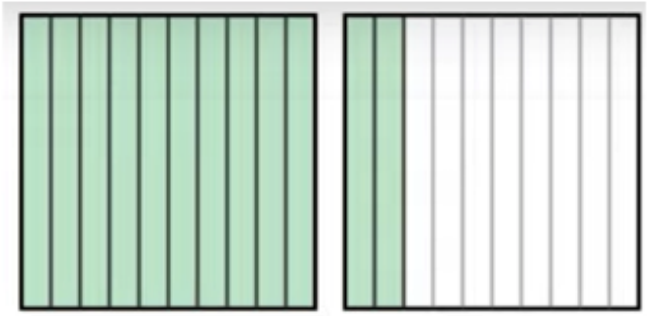
  - Sample answer that indicates an incomplete understanding or a misconception: *Student does not convert tenths to hundredths, adds the values and find a sum 2/100 or 2/10.*

- **Is 1/10 equivalent to 1/100? Use a model to prove your answer.**
  - Sample answer that indicates understanding: *No, 1/10 is greater than 1/100. (model shown below)*



- **How do 1/10 and 10/100 compare?**
  - Sample answer that indicates understanding: *1/10 is equivalent to 10/100 because if I shade in 1/10 of a whole and 10/100 of a whole they cover the same amount of space.*

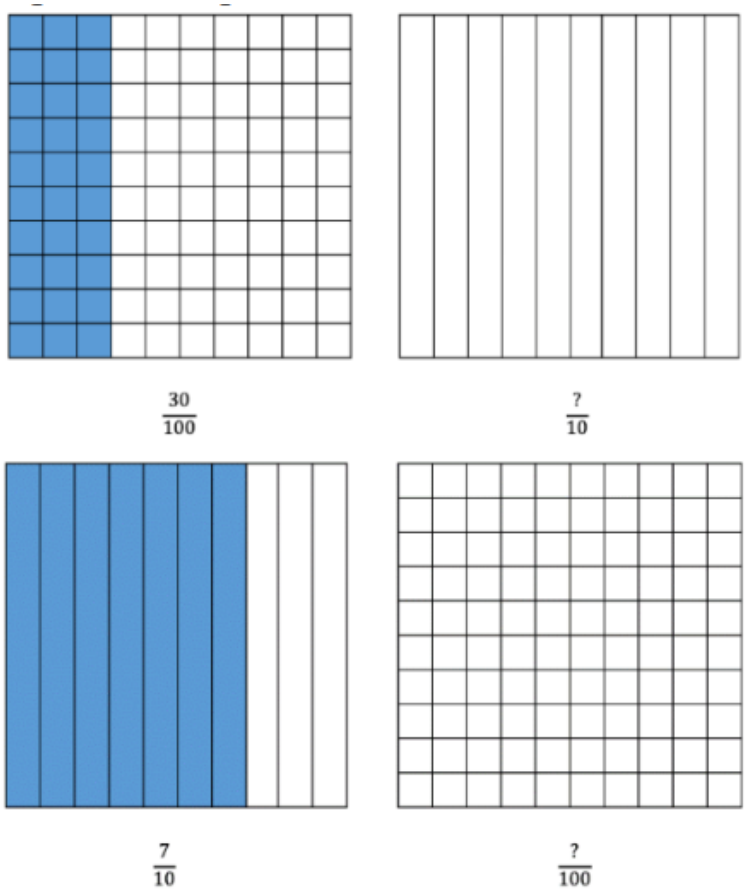
- How can you shade the model to represent $1\frac{2}{10}$?
  - *Sample answer that indicates understanding:*



Instructional Tasks

Instructional Task 1

Shade the models to complete the equivalent fractions.



Instructional Items

Instructional Item 1

An equation is shown. What number completed the equivalent fraction?

$$\frac{6}{10} + \frac{?}{100}$$

Achievement Level Descriptors:

Benchmark	Context	Assessment Limits
MA.4.FR.1.1 Model and express a fraction, including mixed numbers and fractions greater than one, with the denominator 10 as an equivalent fraction with the denominator 100. Clarification 1: Instruction emphasizes conceptual understanding through the use of manipulatives, visual models, number lines or equations.	Mathematical	Decimal notation will not be assessed at this benchmark. Items including models should not require a specific strategy.

ALD 2	ALD 3	ALD 4	ALD 5
models a fraction less than one with the denominator 10 as an equivalent fraction with the denominator 100.	models and expresses a fraction including mixed numbers with the denominator 10 as an equivalent fraction with the denominator 100.	models and expresses a fraction, including mixed numbers and fractions greater than one, with the denominator 10 as an equivalent fraction with the denominator 100.	identifies an error and models and expresses a fraction, including mixed numbers and fractions greater than one, with the denominator 10 as an equivalent fraction with the denominator 100.

Additional Resources:

CPALMS Resources

Khan Academy Video: Visually Converting Tenths and Hundredths

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Resources/Tasks to Support Your Child at Home:

- Khan Academy: Converting fractions to decimals
- Khan Academy: Writing decimals and fractions greater than one
- Using decimal grid paper, have your child model addition problems with denominators of 10 and 100.
    - *Model 5/10 + 20/100 = 70/100*
    - *Model 5/10 + ? = 70/100*