



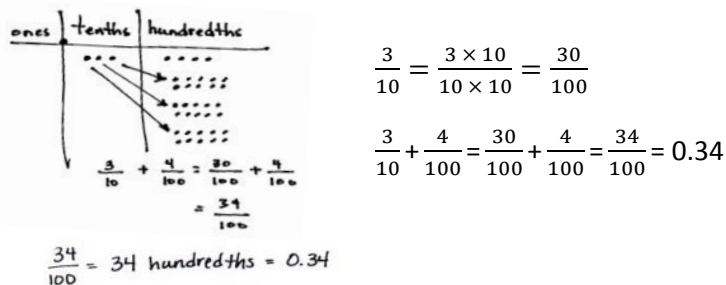
Topic D

Addition with Tenths and Hundredths

4.NF.5, 4.NF.6, 4.NF.3c, 4.MD.1

Focus Standards:	4.NF.5	Express a fraction with denominator 10 as an equivalent fraction with denominator 100, and use this technique to add two fractions with respective denominators 10 and 100. <i>For example, express $\frac{3}{10}$ as $\frac{30}{100}$, and add $\frac{3}{10} + \frac{4}{100} = \frac{34}{100}$. (Students who can generate equivalent fractions can develop strategies for adding fractions with unlike denominators in general. But addition and subtraction with unlike denominators in general is not a requirement at this grade.)</i>
	4.NF.6	Use decimal notation for fractions with denominators 10 or 100. <i>For example, rewrite 0.62 as $\frac{62}{100}$; describe a length as 0.62 meters; locate 0.62 on a number line diagram.</i>
Instructional Days:	3	
Coherence	-Links from: G3–M5	Fractions as Numbers on the Number Line
	-Links to: G5–M2	Multi-Digit Whole Number and Decimal Fraction Operations

Topic D brings together students' work with addition of fractions and their work with decimals. In Lesson 12, students begin at the pictorial level, decomposing tenths using the area model and place value chart to add tenths and hundredths. They progress to using multiplication to generate equivalent fractions and express the sum in fraction form as a decimal, as pictured below.



Students next apply what they know about fraction addition to use multiple strategies to solve sums of tenths and hundredths with totals greater than 1 (see the two examples pictured below), again expressing the solution in decimal form.

$$\frac{9}{10} + \frac{64}{100} = \frac{90}{100} + \frac{64}{100} = \frac{154}{100} = 1.54$$

$$\frac{10}{100} + \frac{54}{100}$$

$$\frac{9}{10} + \frac{64}{100} = \frac{90}{100} + \frac{64}{100} = \frac{154}{100} = 1 \frac{54}{100} = 1.54$$

$$\frac{100}{100} + \frac{54}{100}$$

In Lesson 13, students add ones, tenths, and hundredths in decimal form by converting the addends to mixed numbers in fraction form, creating like denominators, and applying their understanding of the addition of mixed numbers. Once the decimal fractions are added (4.NF.5), the number sentence is written in decimal notation (4.NF.6).

$$\begin{aligned}
 5.6 + 4.53 &= 5 \frac{6}{10} + 4 \frac{53}{100} \\
 &= 5 \frac{60}{100} + 4 \frac{53}{100} \\
 &= 9 \frac{60}{100} + \frac{53}{100} \\
 &= 9 \frac{113}{100} \\
 &= 10 \frac{13}{100} \\
 5.6 + 4.53 &= 10.13
 \end{aligned}$$

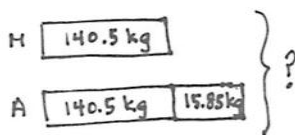
$$\begin{aligned}
 5.6 + 4.53 &= 5 \frac{6}{10} + 4 \frac{53}{100} \\
 &= 9 + 1 + \frac{13}{100} \\
 &= 10 \frac{13}{100} \\
 5.6 + 4.53 &= 10.13
 \end{aligned}$$

$$\begin{aligned}
 5.6 + 4.53 &= 5 \frac{60}{100} + 4 \frac{53}{100} \\
 &= 10 \frac{113}{100} \\
 5.6 + 4.53 &= 10.13
 \end{aligned}$$

The addition of decimals is a Grade 5 standard. By converting addends in decimal form to fraction form, Grade 4 students strengthen their understanding both of fraction and decimal equivalence and of fraction addition.

In Lesson 14, students apply this work to solve measurement word problems involving addition. They convert decimals to fraction form, solve the problem, and write their statement using the decimal form of the solution as pictured below.

An apple orchard sold 140.5 kilograms of apples in the morning. The orchard sold 15.85 kilograms more apples in the afternoon than in the morning. How many total kilograms of apples were sold that day?



Solution A

$$\begin{aligned}
 140 \frac{5}{10} + 15 \frac{85}{100} &= 155 \frac{50}{100} + \frac{85}{100} \\
 &= 155 \frac{135}{100} \\
 &= 156 \frac{35}{100} \\
 140 \frac{5}{10} + 156 \frac{35}{100} &= 296 \frac{50}{100} + \frac{35}{100} \\
 &= 296 \frac{85}{100}
 \end{aligned}$$

The apple orchard sold 296.85 kilograms of apples.

Solution B

$$\begin{aligned}
 (2 \times 140 \frac{5}{10}) + 15.85 &= 280 \frac{10}{10} + 15 \frac{85}{100} \\
 &= 296 \frac{85}{100}
 \end{aligned}$$

The apple orchard sold 296.85 kilograms that day.

A Teaching Sequence Toward Mastery of Addition with Tenths and Hundredths

Objective 1: Apply understanding of fraction equivalence to add tenths and hundredths.
(Lesson 12)

Objective 2: Add decimal numbers by converting to fraction form.
(Lesson 13)

Objective 3: Solve word problems involving the addition of measurements in decimal form.
(Lesson 14)