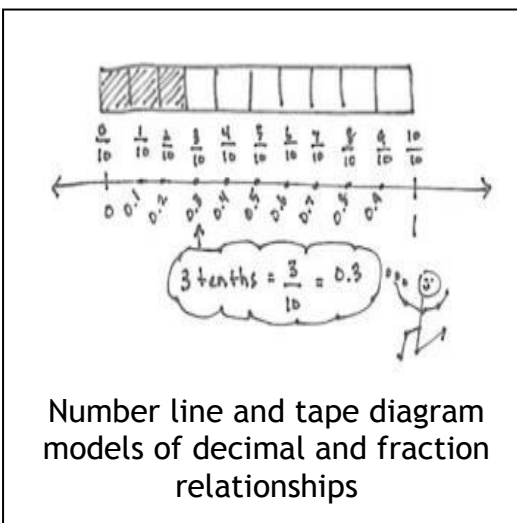


Decimal Fractions

Students explore decimal numbers and their relationship to decimal fractions ($\frac{1}{10}$, $\frac{1}{100}$, etc.), learning to express a given quantity in both fraction and decimal forms. Students build on the work they did with fractions in Module 5, apply the same reasoning to decimal numbers, and set the stage for decimal operations in Grade 5.



New Terms in this Module:

Decimal number: number written using place value units that are powers of 10

Decimal expanded form: e.g., $(2 \times 10) + (4 \times 1) + (5 \times 0.1) + (9 \times 0.01) = 24.59$

Decimal fraction: a fraction with a denominator of 10, 100, 1,000, etc.

Decimal point: period used to separate the whole number part from the fractional part of a decimal number

Fraction expanded form: e.g., $(2 \times 10) + (4 \times 1) + (5 \times \frac{1}{10}) + (9 \times \frac{1}{100}) = 24 \frac{59}{100}$

Hundredth: place value unit such that 100 hundredths equals 1 one

Tenth: place value unit such that 10 tenths equals 1 one

Familiar Terms:

Expanded Form Fraction



Fraction Expanded Form

$$(3 \times 10) + (4 \times 1) + (3 \times \frac{1}{10}) = 34 \frac{3}{10}$$

Decimal Expanded Form

$$(3 \times 10) + (4 \times 1) + (3 \times 0.1) = 34.3$$

3 tens, 4 ones, and 3 tenths:
Fraction Expanded Form and
Decimal Expanded Form

What Came Before this

Module: Students explored fraction equivalence, compared and represented fractions and mixed numbers, and added and subtracted fractions and mixed numbers.

What Comes After this

Module: Students build their skills with measurement as they relate multiplication to the conversion of measurement units. They solve unit conversion problems using multiple strategies.

+ How You Can Help at Home:

- Continue to practice and review multiplication and division math facts—this greatly supports work with fractions.
- In any decimal number, ask your student the value of each digit, e.g., the 4 in 5.4 is 4 tenths.

Key Common Core Standards:

- Understand decimal notations for fractions, and compare decimal fractions.**
 - Express a fraction with denominator 10 as an equivalent fraction with denominator 100.
 - Use decimal notation for fractions with denominators 10 or 100.
 - Compare two decimals to hundredths by reasoning about their size.
- Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.**
 - Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals.

Hundreds	Tens	Ones	.	Tenths	Hundredths
3	7	8		7	3

3 hundreds + 7 tens + 8 ones + 7 tenths + 3 hundredths

Place Value Chart with decimal numbers to the hundredths, showing how to decompose the number 378.73

Spotlight on Math Models:

Place Value Chart

You will often see this mathematical representation in *A Story of Units*.

A Story of Units has several key mathematical “models” that will be used throughout a student’s elementary years.

Students have seen place value charts as early as Grade 1 in *A Story of Units*. In Module 1 of Grade 4, we made extensive use of the place value chart to the millions, practicing our skills with large whole numbers such as renaming units and comparing numbers. Now that we are working with fractions and decimal numbers, we focus on the part of the place value chart (above) that supports this learning.

Students use the chart to model numbers in the form of a provided template or a quick hand-drawn sketch as they work on a problem. In Module 6, we spend a considerable amount of time and effort learning to write decimal numbers in expanded form and the place value chart works as an important organizing tool. The chart is a powerful reminder of what each digit in each place value represents.

The chart is also a useful tool to pictorially support students in renaming numbers. Just as 12 is 1 ten 2 ones or 12 ones, 0.79 is 7 tenths 9 hundredths or 79 hundredths. Renaming units is an important skill, previously practiced with whole numbers and now extended to decimal numbers supporting such concepts as comparing, ordering, rounding, and adding decimal numbers.

Sample Problem from Module 6:

(Example taken from Module 6, Lesson 7)

Use the place value chart to answer the following questions. Express the value of the digit in unit form.

hundreds	tens	ones	.	tenths	hundredths
8	2	7		6	4

- The digit _____ is in the hundreds place. It has a value of _____.
- The digit _____ is in the tens place. It has a value of _____.
- The digit _____ is in the tenths place. It has a value of _____.
- The digit _____ is in the hundredths place. It has a value of _____.