InsightMath California

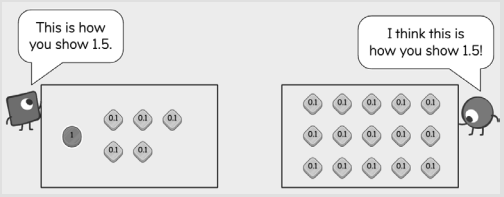
Extending Place Value, Addition and Subtraction to Decimals

Family Guide | Grade 5 | Unit 1

Your student is exploring how multiplying and dividing by powers of 10 is the foundation for decimal numbers.

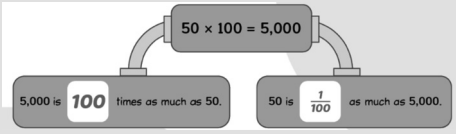
Key Math Ideas

This unit helps students expand their understanding of numbers by building on what they already know about whole numbers to see how our number system includes values less than one as decimals up to the thousandths place. Students will represent decimals in different ways and use visual models, place value charts, and patterns to compare, add, and subtract numbers with decimals.



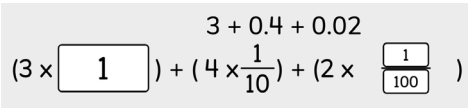
Representing 1.5 as 1 one and 5 tenths or 15 tenths.

They will discover that the patterns they learned with whole numbers work the same way with decimals. Each digit's value depends on its position, with each place value being ten times bigger than the place value to its right and one-tenth the value of the place value to its left. Students will also explore how multiplying and dividing by powers of 10 shifts digits to the left or right. For example, when multiplying 0.03 x 10, the digit 3 shifts from the hundredths place to the tenths place, so 0.03 x 10 = 0.3.

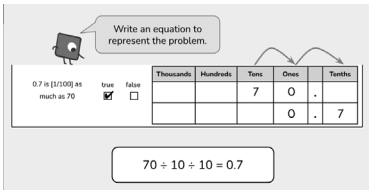


→ In the first half of the unit, your student will learn to

- read, write, and say decimals to the thousandths place;
- use visual models, place value charts, and patterns to describe the relationship between place values next to one another (for example, the 3 in 3.4 is 10 times greater than the 3 in 0.3 or the 5 in 2.045 is as $\frac{1}{100}$ as much as the 5 in 7.5);
- represent decimal numbers with visual models, standard form, written form, and expanded form (as shown in the example to the right);
- locate decimals to the thousandths place on a number line;
- use visual models, place value charts, and estimation to compare and round numbers with decimals up to the thousandths place.



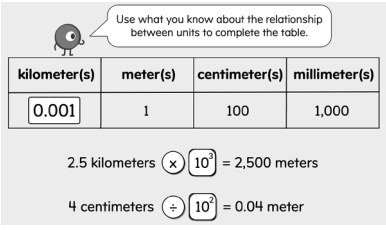
The above shows the expanded form for the number 3.42, which is the standard form.



Using the place value chart to show how dividing by 10 shifts each digit left, making its value $\frac{1}{10}$ of what it was.

→ In the second half of the unit, your student will learn to

- add and subtract decimals to the hundredths place using visual models and place value strategies, including the standard algorithm (carrying and borrowing);
- estimate to determine if an answer is reasonable when adding or subtracting decimals;
- explain how a power of 10 is the number of times 10 is multiplied by itself, such as 10 x 10 = 100
- write powers of 10 using exponents and explain why, such as writing 1,000 as 10^3 because 10 x 10 x 10 = 1,000;
- multiply and divide whole numbers and decimals repeatedly by ten or a power of ten and explain how the location and value of each digit changes when shifted left or right;
- convert measurements in the metric system by multiplying or dividing by powers of 10 and solve related real-world problems.



Helpful Hint

When comparing decimal numbers, sometimes students use the number of digits to determine which decimal is greater or less. For example, they may think more digits means greater, like saying 0.567 is greater than 0.6 because 0.567 has four digits and 0.6 only has two. Sometimes students also think that fewer digits means greater, like saying that 0.7 (7 tenths) is greater than 0.93 (93 hundredths) because tenths are greater than hundredths. Encourage your students to use place value thinking and language when comparing numbers. We want them to recognize that 0.7 is 7 tenths and no hundredths and 0.93 is 9 tenths and 3 hundredths. This means that 0.93 is greater than 0.7 because 9 tenths is greater than 7 tenths.

Tips for Supporting Your Student at Home

Questions to Ask Your Student

→ In the first half of the unit:

- What do you know about the value of the digits in this number?
- How can you represent this number in expanded form?
- What is another way you can represent the decimal number?
- How can you use place value to compare the decimal numbers?
- How does rounding decimal numbers compare to rounding whole numbers?

→ In the second half of the unit:

- How can you add and subtract the decimal numbers efficiently?
- How can estimating sums and differences help you check your work?
- Why do exponents help us represent repeated multiplication of 10?
- How can you use exponents and powers of 10 to convert length measures?

If...	Try...
your student aligns the digits in decimal numbers to the right when adding or subtracting decimals instead of aligning by place value, such as shown in the example below:	reminding your student that adding and subtracting decimal numbers is like adding and subtracting whole numbers, where each place needs to be add to or subtract from the same place. Support your student to use the decimal point to help them align each place value.

Student Strengths Spotlight

I value mistakes.	Exploring new ideas can lead to mistakes, and students take this opportunity to recognize that every mistake is an opportunity to learn.
I do not give up, even when a problem is challenging.	Using a positive mindset, students explore how they learn and grow with every challenging problem.
I notice patterns and try to apply them.	Students recognize place value patterns and patterns when multiplying and dividing by powers of 10 then use these patterns to explore new problems.
I choose representations to help me solve problems and to record and share my thinking.	Students solve and show their thinking in different ways when working with decimal numbers such as number lines, place value charts, or place value models.

Try This Together!

- **Distances in Your Daily Life!** Support your student to look up distances of the places they travel in their daily life, such as from home to school or from school to dance class. If needed, help them round the distances to the nearest hundredths. Ask them addition or subtraction questions and let them find the answers and share their strategy. For example, ask "What is the total distance from home to school, then to baseball practice?" or "How much farther is it from home to gymnastics than from home to hockey practice?"
- **Decimal Scavenger Hunt.** Have your student find decimal numbers on items around the house, such as money on price tags or receipts, or weights on boxes or bags of food. Use them to try these activities:
  - **Ordering:** Ask your student to order them from least or greatest and explain how they know.
  - **More and less:** Have your student tell you how much they would have if it was 10 or 100 times more or if $\frac{1}{10}$ or $\frac{1}{100}$ as much. Ask them to explain their thinking using their place value and powers of ten understanding.
- **Measurement Conversion Fun.** Have your student find some metric measurements of length, mass, or volume in the real world such as width of a pencil eraser in millimeters (length), number of grams of protein on a nutrition label (mass), or liters of juice in a container (volume). Have your student convert the measurement by multiplying or dividing by powers of ten as needed. Students could convert between measurements as shown below:
  - convert length measurements between meters, centimeters, and millimeters;
  - convert mass measurements between kilograms, grams, and milligrams;
  - convert volume measurements between liters and millimeters.