Dear Family,

The next Unit in your child's mathematics class is *Decimal Ops: Computing With Decimals and Percents*. It is the third Grade 6 Unit that helps students develop an understanding of fractions, decimals, and percents. During this Unit, students will work with decimal operations and percents.

Unit Goals

Students will engage in problem situations that help them develop algorithms for adding, subtracting, multiplying, and dividing decimals. They will explore percents in the contexts of tips, taxes, and discounts.

Students will use knowledge acquired in earlier Units, *Comparing Bits and Pieces* and *Let's Be Rational*, to make sense of decimals and percents. They have two ways to make sense of decimals—extending place value concepts and interpreting decimals as fractions. These ideas are related, but they look and feel different. To understand and demonstrate skill in computing with decimals, students need to understand both ways.

Helping With Homework and Conversations About the Mathematics

In your child's notebook, you can find worked-out examples, notes on the mathematics of the Unit, and descriptions of vocabulary words. You can help your child with homework and encourage sound mathematical habits during this Unit by asking questions such as:

- *Which operations will help you solve this problem?*
- *What algorithms will help with the calculations?*
- *About how large will the sum, difference, product, or quotient be?*
- *What number is a reasonable solution to the problem?*
- *What do the decimals and/or percents involved tell you about the problem situation?*

You can help your child with his or her work for this Unit in several ways:

- Ask your child to explain the ideas in a problem. For example, have your child explain why it is important to line up the decimals when adding and subtracting decimal numbers.
- At times, students may work with ideas and algorithms that are different from the ones you learned for adding, subtracting, multiplying, and dividing decimals. Encourage your child to share these methods with you as a way to help them make sense of what they are studying.
- When eating in a restaurant or shopping with your child, ask him or her to estimate the tip of the meal or the tax of a purchase.

Common Core State Standards

All of the Standards of Mathematical Practice are developed during *Decimal Ops*. This Unit focuses on using patterns to reason about problems and being precise in computing with decimals. Students continue their work in modeling with mathematics, upon which they relied heavily in *Comparing Bits and Pieces* and *Let's Be Rational*. *Decimal Ops* focuses on the number sense and ratio domains in the Common Core State Standards. As students work with decimal operations and solve problems using proportional reasoning, they further their skills in these domains.

A few important mathematical ideas that your child will learn in *Decimal Ops* are given on the next page. If you have any questions or concerns about this Unit or your child's progress in class, please contact me. We want this year's mathematics experiences to be enjoyable for your child and promote a firm understanding of mathematics.

Important Concepts	Examples
Choosing an Operation and Estimating Students encounter various situations involving decimals. They decide which operations to use to find a solution. Students estimate to choose operations and check their work.	*Chakara makes a rectangular tablecloth that is 3.5 meters long and 1.5 meters wide. What is the area of the tablecloth?* The dimensions are about 4 meters by about 2 meters. To find the approximate area, multiply 4×2. To find the exact area, multiply 3.5×1.5.
Addition and Subtraction of Decimals Decimals As Fractions Write the decimals as fractions. Find common denominators and add or subtract the fractions. Then express the answer as a decimal. Place Value Interpretation Students analyze the meaning of each digit of a number. They see that they must compute with digits that occupy like places when adding or subtracting numbers.	*Zeke buys cider for \$1.97 and pretzels for \$.89. What is the total cost?* Written as fractions with denominator 100, the cost is $\frac{197}{100} + \frac{89}{100}$, or $\frac{286}{100}$, or 2.86. This is comparable to thinking of the cost in pennies and writing the sum in dollars. To find the difference $3.725 - 0.41$, subtract thousandths from thousandths ($0.005 - 0.000$), hundredths from hundredths ($0.02 - 0.01$), tenths from tenths ($0.7 - 0.4$), and ones from ones ($3 - 0$).
Multiplication of Decimals Decimals As Fractions Write the decimals as fractions. Multiply the fractions. Then write the answer as a decimal. The number of decimal places in the factors relates to the number of decimal places in the answer. Place Value Interpretation Students find patterns in sets of problems to see why counting decimal places makes sense.	*Find the product 0.3×2.3.* As fractions, this is $\frac{3}{10} \times 2\frac{3}{10} = \frac{3}{10} \times \frac{23}{10}$; the product is $\frac{69}{100}$, or 0.69. The denominator of the fraction tells the place value of the decimal. *Find the product 0.25×0.31.* Use the fact that $25 \times 31 = 775$. Tenths $\times$ tenths results in hundredths in the product, so $2.5 \times 3.1 = 7.75$. Tenths $\times$ hundredths results in thousandths, so $2.5 \times 0.31 = 0.775$. Hundredths $\times$ hundredths results in ten-thousandths, so $0.25 \times 0.31 = 0.0775$.
Division of Decimals Decimals As Fractions Express decimals as fractions. Find common denominators. Then divide the numerators. Place Value Interpretation Write an equivalent problem: multiply the dividend and the divisor by the same power of ten until both are whole numbers.	*Find the quotient $3.25 \div 0.5$.* Rewrite the expression as $\frac{325}{100} \div \frac{5}{10} = \frac{325}{100} \div \frac{50}{100}$. This is the same as $325 \div 50$, which is $6\frac{1}{2}$ or 6.5. This approach explains why moving decimal points works. $0.015\overline{)37.5} = 0.015 \times 1{,}000\overline{)37.5 \times 1{,}000} = 15\overline{)37{,}500}$
Decimal Forms of Rational Numbers Finite (Terminating) Decimals Rational numbers with decimal forms that "end" are finite decimals. The simplified fraction form has only 2s or 5s in the prime factorization of the denominator. Infinite (Repeating) Decimals Rational numbers with decimal forms that "continue forever" but repeat are infinite decimals. The simplified fraction form has numbers other than 2 or 5 in the prime factorization of the denominator.	$\frac{1}{2} = 0.5$; $\frac{3}{4} = 0.75$; $\frac{1}{8} = 0.125$; $\frac{12}{75} = 0.16$ $\frac{1}{3} = 0.3333\ldots$; $\frac{2}{3} = 0.6666\ldots$; $\frac{8}{15} = 0.5333\ldots$; $\frac{3}{7} = 0.4285714285714\ldots$
Finding Percents This Unit includes many types of percent problems, including to find • a percent of a number, based on the total and the percent rate • the total amount, based on the percent of the amount and the percent rate • the percent rate, based on the percent of the amount and the total	*Jill buys a \$ 7.50 CD. Sales tax is 6%. How much is the tax?* 1% of \$7.50 = $\frac{1}{100}$ of \$7.50, or 0.075. So, 6% of \$7.50 is 0.075×6, or \$.45. *Jill received a \$ 2.50 tip. The tip was 20% of the bill. How much was the bill?* 20% of some number is \$2.50. It takes five 20%s to make 100%. $5 \times \$2.50 = \$12.50$, so the total bill was \$12.50. *Sam got a \$12 discount on a \$48 shirt. What percent was the discount?* There are four 12s in 48, so the percent is $\frac{1}{4}$ of 100%, or 25%.