Gateway Regional School District

Atlas

Unit Plan

From Hundredths to Hundred-thousands

Chester / Littleville Elementary / Grade 4 / Mathematics

Week 14 - Week 18 | 5 Curriculum Developers | Last Updated: Mar 20, 2024 by LeBlanc, Deanna

Style Guide

What is the purpose of the unit? What are the major take-aways?

Standards

MA: Mathematics (2017)

MA: Grade 4

Number & Operations in Base Ten

4.NBT Generalize place value understanding for multi-digit whole numbers less than or equal to 1,000,000.

- [x] 1. Recognize that in a multi-digit whole number, a digit in any place represents ten times what it represents in the place to its right. Show Details
- [x] 2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
- [x] 3. Use place value understanding to round multi-digit whole numbers to any place.

4.NBT Use place value understanding and properties of operations to perform multi-digit arithmetic of whole numbers less than or equal to 1,000,000.

- [x] 4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.

Number & Operations—Fractions

4.NF Understand decimal notation for fractions, and compare decimal fractions.

- [x] 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. Show Details
- [x] 6. Use decimal notation to represent fractions with denominators 10 or 100 Show Details
- [x] 7. Compare two decimals to hundredths by reasoning about their size. Recognize that comparisons are valid only when the two decimals refer to the same whole. Record the results of comparisons with the symbols >, =, or <, and justify the conclusions, e.g., by using a visual model.

Enduring Understandings

1. Place Value Hierarchies:
Students will understand that place value is a foundational concept in mathematics where the position of a digit in a number determines its value. Each place represents ten times what it would represent in the place immediately to its right, which creates a hierarchy of value within multi-digit numbers.

2. Number Representation:
Students will understand that multi-digit numbers can be

Essential Questions

1. Understanding Place Value and the Value of Digits:
- How does the position of a digit within a number determine its value?
- What happens to the value of a digit when we move it one place to the left or right?
- Why is it important to understand the value of digits when reading, writing, or comparing numbers?

2. Reading, Writing, and Comparing Multi-digit Numbers:

represented in multiple ways, including base-ten numerals, number names, and expanded form. This ability to convert between these forms is critical for comprehending the size and scale of numbers, as well as for communicating mathematical ideas clearly.

3. Comparison and Relationships:
Students will understand how to compare multi-digit numbers by examining the value of digits in corresponding places. Through the use of symbols such as >, =, and <, students can convey and understand the relative magnitude of numbers, including identifying numbers as being greater than, less than, or equal to each other.

4. Rounding for Reasonableness:
Students will understand that rounding is a powerful tool for approximating and simplifying numbers. They will learn to use place value understanding to round multi-digit numbers effectively, which is helpful in making estimates and assessing the reasonableness of answers.

5. Mathematical Fluency:
Students will understand that fluency in addition and subtraction is essential for solving real-world problems. They will learn to use the standard algorithm efficiently to add and subtract multi-digit whole numbers, thereby building an essential mathematical skill set.

6. Fraction Equivalence and Operations:
Students will understand that fractions can represent the same value even when their numerators and denominators differ (e.g., 1/10 is equivalent to 10/100). Understanding this concept of equivalence is essential for performing operations with fractions, such as adding fractions with different denominators. Students will learn strategies to convert and add fractions, deepening their understanding of fractional parts and how they relate to each other within the base-ten system.

- How can we use base-ten numerals, number names, and expanded form to represent the same multi-digit number?
- What strategies can be used to compare two multi-digit numbers effectively?
- When comparing numbers, how do we determine which is greater, which is less, or if they are equal?

3. Rounding Multi-digit Whole Numbers:
- What does it mean to round a number to a particular place value?
- Why might we need to round numbers in real-life situations?
- How does understanding place value help us to round numbers accurately?

4. Addition and Subtraction of Multi-digit Whole Numbers:
- What steps are involved in the standard algorithm for adding or subtracting multi-digit numbers?
- How can we check if our addition or subtraction of multi-digit numbers is accurate?
- Why is fluency in adding and subtracting multi-digit numbers useful in everyday life?

5. Fractions with Denominators of 10 and 100:
- How can we express a fraction with a denominator of 10 as an equivalent fraction with a denominator of 100?
- What are the benefits of converting fractions to have a common denominator before adding them?
- How do equivalent fractions help us to add fractions with denominators of 10 and 100?

Content

In this unit, students learn to express both small and large numbers in base ten, extending their understanding to include numbers from hundredths to hundred-thousands.
In previous units, students compared, added, subtracted, and wrote equivalent fractions for tenths and hundredths. Here, they take a closer look at the relationship between tenths and hundredths and learn to express them in decimal notation. Students analyze and represent fractions on square grids of 100 where the entire grid represents 1. They reason about the size of tenths and hundredths written as decimals, locate decimals on a number line, and compare and order them.
Students then explore large numbers. They begin by using base-ten blocks and diagrams to build, read, write, and represent whole numbers beyond 1,000. Students see that ten-thousands are related to thousands in the same way that thousands are related to hundreds, and hundreds are to tens, and tens are to ones.
As they make sense of this structure (MP7), students see that the value of the digit in a place represents ten times the value of the same digit in the place to its right.
Students then reason about the size of multi-digit numbers and locate them on number lines. To do so, they need to consider the value of the digits. They also compare, round, and order numbers

Skills

Section A Goals
- Represent, compare, and order decimals to the hundredths by reasoning about their size.
- Write tenths and hundredths in decimal notation.

Section B Goals
- Read, represent, and describe the relative magnitude of multi-digit whole numbers up to 1 million.
- Recognize that in a multi-digit whole number, the value of a digit in one place represents ten times what it represents in the place to its right.

Section C Goals
- Compare, order, and round multi-digit whole numbers within 1,000,000.

Section D Goals
- Add and subtract multi-digit whole numbers using the standard algorithm.

through 1,000,000. They also use place-value reasoning to add and subtract numbers within 1,000,000 using the standard algorithm. Throughout the unit, students relate these concepts to real-world contexts and use what they have learned to determine the reasonableness of their responses.
Throughout the unit
Throughout the unit, warm-up routines help students to make connections between previously learned concepts to the current concepts being developed. The Number Talk activities allow students to:

- leverage their knowledge of fractions to build their understanding of decimals,
- use the relationship between addition and subtraction to perform computation of multi-digit numbers, and
- relate the idea of composing and decomposing numbers to that of regrouping when using the standard algorithm for addition and subtraction.

How will you gauge student learning?

Assessments

4.4 End-of-Unit Assessment | Summative | Written Test

Grade4-4-End-of-Unit-Assessment-assessment.pdf

7 State Standards Assessed

How will students learn?

Learning Activities

Section A:
Previously, students learned that there are 10 hundredths in 1 tenth and explored tenths and hundredths in fraction notation. In this section, they learn to represent and reason about tenths and fractions in decimal notation.
Students relate 1/10 to the notation 0.1 and 1/100 to 0.01. They learn to read 0.1 as “one tenth” and 0.01 as “one hundredth,” the same way these numbers are called when written in fraction notation. To see the connections between the fraction notation, decimal notation, and the word name, students reason with unit squares (representing 1) divided into hundredths.
The squares in this section are shaded from left to right, to reflect the digits in a decimal. For example, the number 1.33 is represented by shading a full square that represents 1, 3 columns in the next large square, and 3 small squares in the adjacent column.

The structure of the unit square grid helps to illustrate the equivalence of 10/100 and 1/10. It also allows students to see that 0.10 is equivalent to 0.1, and to generalize it to other equivalent tenths and hundredths, for instance, 0.20=0.2 and 0.5=0.50.
In these materials, decimals less than 1 are expressed with a leading zero. Consider explaining to students the zero is sometimes omitted and this doesn’t impact the value of the decimal.
Later in the section, students use benchmarks such as 0.5 and the relationship between tenths and hundredths to locate and label decimals on a number line. They compare and order decimals based on size and write comparison statements using the symbols <, >, and =.

Section B:
In this section, students make sense of whole numbers up to the hundred-thousands place, learn to read and write them, and deepen their understanding of place value.
Students begin by using base-ten blocks and diagrams to represent and reason about multi-digit numbers. They quickly see the limits of using base-ten blocks to represent large numbers when the smallest cube represents 1. For example, this collection represents 1,325. If the smallest block has a value of 10 or ten times as much, however, the same collection would represent 13,250. The reasoning here prepares them to think about place-value relationships.

As students analyze and draw base-ten diagrams and write multi-digit numbers in expanded form, they observe structure and begin to understand the value of the digit in each position (MP7). They see the “ten times” relationship between the value of a digit in one place and that of the same digit in a place to its right. For example, 300,000=10×30,000300,000=10×30,000, so the 3 in 347,000 has a value ten times that of the 3 in 34,700.
Students also see this “ten times” relationship as they locate numbers on a number line. If the endpoints of a number line are each ten times those on another number line, points that are in the same position on the two number lines are related by a factor of 10 as well.

Students use these observations of structure to compare, order, and round numbers in the next section.

Section C:
In grade 3, students compared, ordered, and rounded numbers within 1,000. In this section, they extend that work to include numbers within 1,000,000.
Students begin by placing multi-digit numbers on a number line with increasing levels of precision and then making comparisons. In comparing numbers, including those that are missing digits in some places, they make use of structure to determine the size of numbers and the significance of the value of the digits (MP7).

Previously, students rounded numbers to the nearest multiple of 10 or 100. Here, they round numbers within 1,000,000 to the nearest multiples of 10, 100, 1,000, 10,000, and 100,000. When a number is exactly halfway between two consecutive multiples of 1,000, 10,000, or 100,000, they round up, following the convention used in grade 3 when rounding to the nearest multiple of 10 or 100.
Students apply their understanding of place value and rounding to solve contextual problems. They also engage in aspects of mathematical modeling as they consider the implications of rounding large numbers in different situations (MP4).

Section D:
In grade 3, students used various representations and strategies to add and subtract within 1,000, including strategies that rely on place value. In this section, they build on those strategies while also learning about the standard algorithm for addition and subtraction. They begin working toward the end-of-grade expectation of fluency with addition and subtraction within 1,000,000.
As in earlier grades, students attend to the relationship between addition and subtraction, and find sums and differences by composing and decomposing numbers. They compare an algorithm that uses expanded form and the standard algorithm, and observe the role of place value in both algorithms.

Students start by finding sums that do not require composing a unit in any given place and progress towards those that require composing a unit multiple times.
Likewise, they start by subtracting numbers that don’t require decomposing a unit and move towards differences that require multiple decompositions. Students practice adding and subtracting numbers both in and out of context.

Differentiated Instruction

Technology Integration

21st Century Skills

Positive Behavior

CASEL

Collaborative for Academic, Social, and Emotional Learning

Resources

Teacher Notes and Reflections

One optional lesson