Unit 1: Domain: Number and Operations in Base Ten

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Marking Period 1**
Length: **14 - 15 Weeks**
Status: **Published**

Unit Overview

By the end of Unit 1, students will be able to fluently multiply multi-digit whole numbers using the standard algorithm. Students will also be able to find whole-number quotients of whole numbers (4-digits by 2-digits). Additionally, the unit will help students extend their understanding of place values to decimals. Students also will be able interpret, write, and evaluate numerical expressions and equations. The students will solve multi-digit multiplication using the standard algorithm. These skills will be extended to all operations of decimals through hundredths. The teacher will use various types of station activities in these areas, and final assess daily in ticket to leaves.

Standards

MA.5.OA.A.2	Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them.
MA.5.NBT.A.1	Recognize that in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left.
MA.5.NBT.A.2	Explain patterns in the number of zeros of the product when multiplying a number by powers of 10, and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10.
MA.5.NBT.A.3	Read, write, and compare decimals to thousandths.
MA.5.NBT.A.3a	Read and write decimals to thousandths using base-ten numerals, number names, and expanded form, e.g., $347.392 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (1/10) + 9 \times (1/100) + 2 \times (1/1000)$.
MA.5.NBT.A.3b	Compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
MA.5.NBT.A.4	Use place value understanding to round decimals to any place.
MA.5.NBT.B.5	Fluently multiply multi-digit whole numbers using the standard algorithm.
MA.5.NBT.B.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
MA.5.NBT.B.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method and explain the reasoning used.

Essential Questions

- How can patterns be used to understand and use decimal place values?
- How do place-value patterns help us to understand large numbers?
- What makes a computational strategy effective and efficient?
- When do we see decimals represented in everyday life?

Application of Knowledge and Skills...

Students will know that...

- a numerical expression is a mathematical "phrase" that stands for a single number (for example 4 + 1) and can be evaluated
- calculations can be illustrated and explained by using a variety of methods, such as writing equations or creating rectangular arrays and/or area models
- in a multi-digit number, a digit in one place represents 10 times as much as it represents in the place to its right and 1/10 of what it represents in the place to its left. 0x • B. strategies based on place value, the properties of operations, and/or the relationship between multiplication and division can be used to find whole-number quotients. 0x • C. the standard algorithm for multiplying and dividing is a useful tool for computations. 0x • D. calculations can be illustrated and explained by using a variety of methods, such as writing equations or creating rectangular arrays and/or area models. 0x • E. a numerical expression is a mathematical "phrase" that stands for a single number (for example 4 + 1) and can be evaluated. 0x • F. the following can be used to add, subtract, multiply, and divide decimals: • concrete models/ drawings • strategies based on place value • strategies based on properties of operations • strategies based on the relationship between addition and subtraction
- strategies based on place value, the properties of operations, and/or the relationship between multiplication and division can be used to find whole-number quotients
- the following can be used to add, subtract, multiply, and divide decimals: • concrete models/ drawings
- strategies based on place value • strategies based on properties of operations • strategies based on the relationship between addition and subtraction
- the standard algorithm for multiplying and dividing is a useful tool for computations

Students will be able to...

- fluently multiply multi-digit whole numbers using the standard algorithm
- add, subtract, multiply, and divide decimals to hundredths, using a variety of strategies.
- compare two decimals to thousandths based on meanings of the digits in each place, using >, =, and <. symbols to record the results of comparisons.
- explain patterns in the number of zeros of the product when multiplying a number by powers of 10.
- explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10.
- find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors.
- fluently multiply multi-digit whole numbers using the standard algorithm.

- illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.
- interpret numerical expressions without evaluating them.
- read and write decimals to thousandths using base-ten numerals, number names, and expanded form.
- read, write, and compare decimals to thousandths.
- use place value understanding to round decimals to any place.
- use whole-number exponents to denote powers of 10.

Assessments

- Benchmark Tests
- End of the Year Test
- Other visual assessments during the guided practice part of the lesson, students record responses to problems on individual whiteboards. Teacher will monitor for errors, and assist where needed
- Placement Test: used to test prior knowledge
- Task Cards: used as a reinforcement of a topic
- Topic Math Projects
- Topic Quick Checks: can be given after each section in the topic to check for understanding
- Topic Tests: given after each topic

Activities

Problem of the Day-Present a daily problem that serves as a review from the previous day's lesson.

Vocabulary - Have students create a chart for each new vocabulary word that includes the word's meaning and an example or use vocabulary cards as flash card game

Station activities- Each section has center activities to reinforce skill (leveled)

- Toss and Talk - Toss a die and complete the problem to that number. Explain and discuss with your partner.
- Display the Digit- Answer the problem an display the tile that represents the answer.
- Quick Questions - Listen questions and answer it mentally
- Think to Together- Put tiles (1-4) in a bag and pick a letter (A-F). Then pull out tile and picked letter and complete that problem. Students will then discuss and explain answers
- Clip and Cover - Pick two numbers and cover answer with paper clip. The person to cover three in a row wins.

STEM - Certain sections have Going Digital integrating technology and the use of calculators

- Using calculators to complete problems
- Make each change the calculator and explain your reasons for making it.

- Use Math tools for page 51 for dividing decimals
- Mixed Problem Solving page 33

Interactive Learning - Interactive learning activities at the beginning of each topic for each lesson using topic such as modeling, generalization, being precise, using tools, communications, and reasonableness

Projects - There is a math project for each topic (Topic 1-7) - (See Cross-Disciplinary Instruction for projects and page numbers)

Practice work - Communicator practice can be done using Independent work and problem- solving practice problems in each section.

- Play SCOOT for certain sections or review for topic tests
- Make Task cards and use answer sheets for assessment

Ticket to Leave - Quick Checks on each sections

Activities to Differentiate Instruction

General strategies for modification of this curriculum for students with special needs, ELL, and gifted learners:

- **General strategies:**
  - preferential seating
  - manipulatives
  - modified workbook pages
  - practice or enrich homework pages
- **Center activities** - There are leveled center activities for each section. There is a separate activity for "Intervention", and then "On-Level" and "Advanced" are in spiral book.
- **Leveled practice pages** - There are three leveled (Reteaching, Practice, and Enrichment) sheets that can be used for practice or homework.
- **Math Concept Readers:** These readers allow the student to read the story at different levels- above level, on level, and below level. (also available on line with audio) Complete the Think and Respond and Write Math questions at the conclusion of each book.
- **Assessment**- Using Quick Check Review can determine differentiated instruction levels using sample answers and using the rubric at the Close/ Assess and Differentiate section in the teacher edition.

Content specific modification for students with special needs, ELL, and gifted learners:

- **Topic 1:**

- **Below level students:**
  - To motivate students and to show them a real-world application of decimals in the thousandths, have them research and compare the battling averages of their favorite baseball players.
  - To reinforce place-value meanings, make a concentration game. On one set of cards write place-value names such as tens, hundred thousands, tenths, and so on. On another set of cards write numbers such as 20, 200,000 and 0.2. Have pairs of students match the place-value names and corresponding numbers.
- **Students with special needs:**
  - To help students with special needs understand decimal place value, model various numbers on a hundredths grid or using a hundreds flat. To give students an understanding of the relative size of thousandths, lay 10 hundreds flats end to end.
  - Review the base ten nature of the place value system with students using unit cubes. Show how 10 groups of one make 10 and 10 groups of ten make 100 and 10 groups of one hundred make 1,000. Ask students how many thousands make 10,000 and how many hundred thousands make 1,000,000.
  - Emphasize the patterns within the periods of the place value char.t For example, the second place value in each period uses the word ten in the place value name ten, ten thousand, ten million, ten billion.

- **ELL**
  - **Emerging:** Make a place-value chart with three columns. In the first column, write the place value name: ones, tens, hundreds, and so on up to hundred billions. In the middle column write the number representing the place value: 1, 10, 100, and so on. In the last column write the number of zeros. Display the chart for reference. Make a similar chart for decimal place values.
  - **Expanding:** Have students play a game with 2 number cubes. The first number rolled represents the value of a digit. The second number rolled represents the number of zeros in the number.
  - **Bridging:** Write 7-digit numbers on index cards. Distribute the cards to students and have each one read the number aloud. Instruct students to line up in order of their cards from least to greatest.

- **Advanced/Gifted:**
  - If students have a strong understanding of place value through the billions, challenge them to extend the place-value chart and to write numbers in the trillions, quadrillions and quintillion. Students can also extend decimal place values.
  - Have pairs of students play a mystery number game. Have each partner write a series of clues describing a number. Examples of clues might be, "the digit in the ten thousands place is half the digit in the hundreds place. The digit in the hundreds place is two times four." Players swap clues and try to correctly name one another's numbers. Encourage students to use decimal values as well.

- **Topic 2:**
  - **Below level students:**
    - Students with poor comprehension and conceptualization may have difficulty performing the steps when rounding numbers.
    - Provide these students with a visual practice of the algorithm. Have six students come to the front of the room. Give each student a sheet of paper with one digit from the number 374,865.
    - Have the student with the digit in the ten-thousands place hold up their sheet of paper. Remind students that if they want to round to this place value, they must look at the

digit to the right oft he rounding place. Have the student holding the 4 step forward. Point out that 4 is less than 5; leave the rounding digit alone. Have students holding digits 4, 8, 6, 5 exchange their papers for ones containing a zero.

- **Students with special needs:**
  - Students with dyslexia may have trouble accurately copying larger numbers.
  - Have students work with a partner who dictates the numbers in each problem. When dictating numbers, the reader says each digit rather than reading the number form, for example, 84,652 is dictated as "eight, four, comma, six, five, two."

- **ELL**
  - Students may have difficulty relating to some of the vocabulary words in this topic.
  - **Emerging:** Have students write the definitions and examples for Commutative Property, Associative Property, Compensation, and Compatible Numbers on a sheet of paper or index card. Allow students to reference this card when completing problems.
  - **Expanding:** Have students l look up definitions for the everyday words commute, associate, compensate, and compatible. Have them compare the definitions of these everyday words with the math terms commutative, associative, compensation, and compatible numbers. Discuss how the meanings of the related words can help students remember the mathematical definitions.

- **Advanced/Gifted:**
  - Students who have strong reasoning skills and strong conceptualization may be able to estimate sums and differences of number sentences with larger numbers.
  - Have these students estimate the sum or difference to problems in the millions.

- **Topic 3:**
  - **Below level students:**
    - Use place-value blocks and arrays to model the partial products method.
    - Allow students who have difficulty aligning digits to do their work on grid paper, writing one number in each square.
  - **Students with special needs:**
    - To help special needs students multiply multiples of 10, write the numbers 1 through 9 and x on separate index cards. Write 0 on six separate index cards. Have students use the cards to form multiplication sentences such as 30 x 600. To help them understand how many zeros to write, have them physically separate and then find the basic fact, and then slide the zeros over to complete the product.
    - If students have difficulty rounding, allow them to use number lines or place-value blocks to round.
    - If students have trouble properly aligning digits when multiplying, allow them to work on grid paper. Show them how to write on en umber in each square.

  - **ELL**
    - Have students talk through problems using both the expanded and traditional algorithms. It may also be useful for students to write out hte steps for reference.
    - **Emerging:** Connect the terms for multiplication properties to terms that are more familiar. Write "associate = group; commute = back and forth; identity = self; zero = none" on the board. Have students draw number sentences and arrays to illustrate each property.
    - **Expanding:** Discuss the terms rounded, factors, compatible numbers, overestimates, and underestimates. Then write a word problem on the board and have a student read it aloud. Have pairs think aloud as they estimate the answer and determine if it is reasonable.

        - **Bridging:** On the board write the complete traditional algorithm for multiplying a 3-digit number by a 1- or 2-digit number. Ask volunteers to come to the board to explain each step of the procedure.

    - **Advanced/Gifted:**
        - Show advanced students how to use the expanded algorithm to multiply greater numbers mentally.
        - If students grasp multiplying 3-digit numbers by 2-digit numbers, have them work in pairs to multiply greater number.
        - Show students how to break numbers apart and use the Distributive Property to multiply greater numbers. It may be helpful to model this initially with place-value blocks.

- **Topic 4:**
    - **Below level students:**
        - Students who have poor retention and difficulty making the transition to new topics can benefit from an activity that helps them to focus on prior knowledge.
        - Write a graphic organizer on the board with Division Skills as the center circle and Dividing by One-Digit Numbers, Basic Facts, Estimating Quotients, and Dividing by Multiples of Ten as four circles connected to the center concept.
        - When a student has trouble dividing, point to each known skill on the organizer and ask if the skill can help.
    - **Students with special needs:**
        - Students with poor reasoning skills may have difficulty understanding the concept of division.
        - Have students use place-value blocks to model the problems. On the board, sketch place0value blocks for 795. Label the diagram 7 hundreds, 9 tens, and 5 ones.
        - Tell students that you want to divide these into 3 equal groups. Erase 1 hundred and draw 10 more tens. Change the label to 6 hundreds 19 tens, and 5 ones. Have a volunteer make 3 equal groups of hundreds. Repeat the process with tens and ones.

    - **ELL**
        - English language learners may find it easier to divide if they have a chart they can point to and follow step by step.
        - **Emerging:** Write the steps to divide on the board. Have students follow the steps as they divide, pointing to each step as they complete it.
        - **Expanding:** Write the steps to divide on the board in a flow chart method. Have the students use the flow chart to help them divide.
        - **Bridging:** Draw an empty flow chart on the board with five boxes. The last box should have an arrow that points back to the first box. Have students discuss the steps to division and decide each step that belongs in the flow chart.

    - **Advanced/Gifted:**
        - Students who have a strong number sense and good higher order thinking skills should have little difficulty extending their understanding to include quotients with three or more digits.
        - Have students complete such problems as 6÷5,244. Be sure to have students check their answer using estimation.

- **Topic 5:**
    - **Below level students:**
        - Review basic multiplication facts with any students who are not yet fluent in this area. Having this base of knowledge will allow students to divide significantly faster and

easier.
    - Have students practice finding compatible numbers. Provide them with lists of division sentences and ask them to list as many reasonable compatible numbers as possible. This helps build students' overall number sense.
    - To help students divide, have them list multiples of the divisor before dividing.
  - **Students with special needs:**
    - Students with special needs may benefit from creating a flow chart showing the steps that are repeated in the long division algorithm.
    - To help students remember vocabulary, make a diagram of divisor, which is the dividend, which is the quotient, and which is the remainder. Write the diagram on poster paper to be displayed in the room.
    - Model the need to regroup place values before dividing using place value blocks. For example, in the problem 432 ÷ 55, show how 4 hundreds blocks cannot be divided into 5 groups, but must instead by traded for 40 tens.

  - **ELL**
    - Repeated practice stating the steps for the division algorithm in the context of solving a problem will help students recall and understand the steps better.
    - **Emerging:** Have students make a flow chart showing the steps of the basic division algorithm: divide, multiply, subtract, compare, bring down, repeat. Allow them to use this chart not only when solving division problems, but also when explaining their solutions to the class. You may also wish to have them diagram a division problem, labeling the divisor, dividend, quotient, and remainder.
    - **Expanding:** When students describe how they solved a problem, make sure they use proper vocabulary such as quotient, divisor, dividend, and remainder and that they refer to numbers appropriately in terms of place value.
    - **Bridging:** Have students work in pairs to divide. The first partner asks a question which relates to then ext step of the procedure, such as "Which place value can you divide first?" or, "Is the number left over less than the divisor?" or, "What do you do with what is left over?"

  - **Advanced/Gifted:**
    - If students seem comfortable using the traditional long division algorithm, you may wish to teach them the partial quotients algorithm.
    - Have advanced students divide 5- and 6- digit numbers by 2-digit numbers without using a calculator.
    - Have students play a target game. A target number is chosen then each roll a number cube 5 times to generate a 3-digit dividend and a 2-digit divisor. Players may arrange the numbers in any order, using each number only once. The player who quotient is closest to the largest number wins.

- **Topic 6:**
  - **Below level students:**
    - Some students may not immediately grasp the concept multiplying decimals with power of 10. Write the chart shown on the board: 756.3x1, 756.3x10, 756.3x100, 756.3x1,000
    - Ask students to solve. Write the answers on the board. Ask children to discuss the patterns they see and make connections.
    - Write more multiplication problems involving powers of 10 on the board. Have students solve the problems and describe the pattern.
  - **Students with special needs:**
    - Students who have difficulty perceiving the diagram at the top of page 158 may have

difficulty grasping the concepts behind multiplying decimals. Make an overhead transparency and work through the example.
- Prepare an alternate version of the diagram. Cut the small squares in each quadrant from a different materials - e.g. top left (1x1) from felt. Glue the squares to a card, leaving space between rows and between columns.

- **ELL**
  - English language learners may have difficulty understanding the procedures for multiplying with decimals.
  - **Emerging:** Review multiplication with whole numbers and then model each step for multiplying with decimals. Use pennies, dimes, and dollars as a concrete way to illustrate the process.
  - **Expanding:** Show the process for multiplying with decimals on the board, and then ask students to describe each step in their own words. Highlight key terms in the steps - such as decimal point, tens place, hundreds place - and clarify their meanings.
  - **Bridging:** Work with students to create step-by-step instruction for multiplying with decimals. Write their sentences on poster paper and display it in the room for students to use as a reference.

- **Advanced/Gifted:**
  - Students who have mastered multiplying with decimals may be able to think more flexibly about the process.
  - Write the equation "4.3 x ? = 430" Challenge students to identify the correct power of 10 (ten to the second power or 100) and ask them to explain why it works.
  - Direct students to make up their own mystery problems. Have them trade with partners to solve each other's equations.

- **Topic 7:**
  - **Below level students:**
    - Some students may not immediately grasp the connections between multiplying and dividing decimals with powers of 10. Write the chart shown on the board: 756.3 ÷ 1,000, 756.3 ÷ 100, 756.3 ÷ 10, 756.3 ÷ 1
    - Ask students to solve. Write the answers on the board. Ask students to discuss the patterns they see and make connections.
    - Write more division problems involving powers of 10 on the board. Have students solve the problems and describe the pattern.
  - **Students with special needs:**
    - Students who have difficulty perceiving the diagram at the top of page 168 may have difficulty grasping the concepts behind dividing decimals. Make an overhead transparency and work through the example.
    - Prepare an alternate version of the diagram. Use plastic straws of different colors, or cut strips of different colored paper. Students better grasp the concept when they can use they manipulatives to show the total cost divided by 3.

  - **ELL**
    - English language learners may have difficulty understanding the procedures for dividing with decimals.
    - **Emerging:** Review division with whole numbers and then model each step for dividing with decimals. Use pennies, dimes, and dollars as a concrete way to illustrate the process.
    - **Expanding:** Show the process for dividing with decimals on the board, and then ask students to describe each step in their own words. Highlight key terms in the steps -

such as decimal point, multiply, and subtract - and clarify their meanings.
    - **Bridging:** Work with students to create step-by-step instructions for dividing with decimals. Write their sentences on poster paper and display it in the room for students to use as a reference.

- **Advanced/Gifted:**
    - Students who have mastered dividing decimals may be able to think more flexibly about the process.
    - Write the equation "4358 ÷ ? = 4.358" Challenge students to identify which power of 10 is the correct divisor (10^3 or 1,000) and ask them to explain why it works.
    - Direct students to make up their own mystery problems. Have them trade with partners to solve each other's equations.

Integrated/Cross-Disciplinary Instruction

Reading and Writing: The Math Concept Readers allow the student to read the story at different levels- above level, on level, and below level. Complete the Think and Respond and Write Math questions at the conclusion of each book.

Topic 1: Social Studies: Sandcastles- converting length for a sandcastle in South Carolina - pg 3

Topic 2: Social Studies: National Parks - finding area of 4 parks and comparing - 27E

Topic 3: Science: Hummingbirds - finding the wing beats per hour in a hummingbird and comparing - pg 59E

Topic 4: Science: Desert animals - research the average life spans of 4 desert animals and comparing - pg 79E

Topic 5: Science: Arches National Parks - research three hiking trails in Arches National Parks the time it take to hike them and average the time - pg 105E

Topic 6: Science: Fibonacci- explaining Fibonacci patterns - pg 131E

Topic 7: Social Studies: Roller coasters: Comparing the length and height of certain roller coasters in the United States - pg 155E

Resources

Topics Categories in book form:

Topic 1: Place Value

Topic 2: Adding and Subtracting Decimals

Topic 3: Multiplying Whole Numbers

Topic 4: Dividing by 1-Digit Divisors

Topic 5: Dividing by 2-Digit Divisors

Topic 6: Multiplying Decimals

Topic 7: Dividing Decimals

Master Enrichment pages

Master Reteaching pages

Master Practice pages

Student Edition workbook

On line Resources available at www.pearsonrealize.com

- Teacher Edition (TE) Textbook
- Student Edition (SE) Textbook
- Tests on line
- Concepts videos
- Math Tools

Extra practice worksheet and activities

NC's description of Common Core Math Standards and Sample Problems

Worksheet with numerical expression brackets & braces

worksheets- multiply and divide by powers of 10

teacher created printables based on CCS

- www.pearsonrealize.com

21st Century Skills

CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.
CRP.K-12.CRP4.1	Career-ready individuals communicate thoughts, ideas, and action plans with clarity, whether using written, verbal, and/or visual methods. They communicate in the workplace with clarity and purpose to make maximum use of their own and others' time. They are excellent writers; they master conventions, word choice, and organization, and use effective tone and presentation skills to articulate ideas. They are skilled at interacting with others; they are active listeners and speak clearly and with purpose. Career-ready individuals think about the audience for their communication and prepare accordingly to ensure the desired outcome.
CRP.K-12.CRP8.1	Career-ready individuals readily recognize problems in the workplace, understand the nature of the problem, and devise effective plans to solve the problem. They are aware of problems when they occur and take action quickly to address the problem; they thoughtfully investigate the root cause of the problem prior to introducing solutions. They carefully consider the options to solve the problem. Once a solution is agreed upon, they follow through to ensure the problem is solved, whether through their own actions or the actions of others.