Unit 2: Domain Number and Operation in Base Ten

Content Area: **Mathematics**
Course(s): **Mathematics**
Time Period: **Marking Period 2**
Length: **15-16 Weeks**
Status: **Published**

Unit Overview

In this unit, students will understand that the three digits of a three digit number represent amounts of hundreds, tens and ones. They will count within 1000 and skip count by 5s, 10s and 100s. They will fluently add and subtract within 1000 using strategies based on base-ten, concrete models and or drawings, place-value concepts, properties of operations and the relationship between addition and subtraction. They will be able to relate the strategy to a written method.

Standards

MA.2.OA.A.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
MA.2.OA.C.3	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.
MA.2.NBT.A	Understand place value.
MA.2.NBT.A.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases:
MA.2.NBT.A.1a	100 can be thought of as a bundle of ten tens — called a “hundred.”
MA.2.NBT.A.1b	The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).
MA.2.NBT.A.2	Count within 1000; skip-count by 5s, 10s, and 100s.
MA.2.NBT.A.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
MA.2.NBT.A.4	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, =, and < symbols to record the results of comparisons.
MA.2.NBT.B.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
MA.2.NBT.B.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.
MA.2.NBT.B.7	Add and subtract within 1000, 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. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds.

MA.2.NBT.B.8	Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.
MA.2.NBT.B.9	Explain why addition and subtraction strategies work, using place value and the properties of operations.
MA.2.MD.B.6	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2,..., and represent whole-number sums and differences within 100 on a number line diagram.

Essential Questions

- How does our place value number system aid us when naming, skip counting, adding and subtracting numbers?
- How do you rename ones to make ten?
- What steps help you to add or subtract within 1000?
- How can you use a model to show regrouping in addition and subtraction?
- What strategies can be used to solve problems?

Application of Knowledge and Skills...

Students will know that...

- Each real number can be associated with a unique point on the number line.
- For a given set of numbers there are relationships that are always true, called properties and these are the rules that govern arithmetic and algebra.
- Mathematics content and practices can be applied to solve problems.
- Numbers can be used for different purposes, and numbers can be classified and represented in different ways.
- Numbers, expressions, measures and objects can be compared and related in different ways.
- The base-ten numeration system is used to record numbers, groups of ten and place value.
- The set of real numbers is infinite and ordered
- There are many strategies that can be used to solve equations.
- There are multiple interpretations of addition, subtraction,multiplication and division and each operation is related to other operations.
- Whole numbers, integers and fractions are real numbers.

Students will be skilled at...

- build and utilize models to represent addition and subtraction equations.
- comparing numbers up to 1000 using symbols.
- grouping objects into tens and ones to show two-digit numbers.
- identifying and recording three-digit numbers in expanded, standard and number word form.
- identifying and writing numbers in a specific order.
- identifying even and odd numbers.
- mentally adding and subtracting multiples up to 1000.
- reading and writing number words within 1000.
- recording addition and subtraction equations utilizing the vertical addition frame.
- skip counting to 1000.
- use estimation strategies when appropriate.
- using multiple addition and subtraction strategies to solve equations.
- utilizing a hundreds chart.
- utilizing a number line to model addition and subtraction.
- utilizing place value models to represent numbers to 1000.

Assessments

- basic facts timed tests
- benchmark tests
- end of year test-administered after completing program.
- Placement Test-administered prior to delivering the program.
- task cards
- topic math projects
- topic quick checks
- topic tests

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)

- Clip and Cover: Students answer questions and try to cover four spaces in a row on a gameboard to win.
- Display the Digits: Students answer the problem and display the tile that rpresents the answer.
- Quick Questions: Toss number cubes and answers questions.

- Teamwork: Students in turn explain the steps in a multi-step process.
- Think Together: Students choose and discuss answers to problems.
- Tic Tac Toe: Students use algebraic rules to compute solutions to problems
- Toss and Talk: Students toss number cubes and explain how to solve resulting problems.

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

- Modeling Two-Digit Numbers p. 150
- Using a Calculator to Add p. 248
- Using a Calculator to Add p. 378

Interactive Learning - Problem-Based Interactive learning activities at the beginning of each topic such as using tools, structure,reasoning, generalizing, assessing reasonableness and modeling.

Topic Opener Projects - There is a math project for each topic (Topic 5-11). See Cross Disciplinary instruction for project and page numbers.

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

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 5**
  - **Below level students:**
    - As below-level students work with even and odd numbers, it is important that they recognize that even numbers can be broken into two equal parts; odd numbers cannot.
    - One way to show breaking even numbers into two equal parts is to place a random number of counters on a table. Have below-level students make as many pairs of counters as possible and determine if there is one counter left over. If so, the number is odd.
    - As children become familiar with the concept of even and odd numbers, demonstrate how the numbers alternate as you count. Begin with 1 and count through 20, clapping on each even number you say.
  - **Students with special needs:**
    - Review with students with special needs how to build tens and ones models using connecting cubes. Count the cubes with the children, emphasizing the transitions from one group of tens to another: "thirty-nine, forty-one."
    - Some children with special needs may find it difficult to work with many numbers at one time. While working with the hundred chart, it may be helpful to limit the numbers the children use. Cover up part of the hundred chart with paper to make it easier for children to focus on a few rows of numbers, rather than many rows.
  - **ELL**
    - Children who are learning English may have well-developed counting and place-value skills in their native languages. Some children may be more comfortable writing numbers than counting aloud. Others may need more practice writing numbers.
    - **Emerging:** Provide opportunities for children to build numbers using connecting cubes.
    - **Expanding:** Describe a number using terms such as tens, ones, before, and after. After children listen to your descriptions, ask them to identify the number.
    - **Bridging:** Ask children to talk with peers about real-life uses of numbers to 100. For example, children may compare various daily temperatures in the newspaper's weather report.
  - **Advanced/Gifted:**
    - Children who quickly build, read, write, and count numbers to 100 can use their place-value skills with numbers to 1,000. You may ask these children to complete the exercises in this topic with larger numbers.
    - Ask children who have a strong visual memory or place-value understanding to answer questions such as, "What is ten more than 56?" or "Which numbers have more than 5 tens and less than 7 tens?" without using cubes or looking at the hundred chart.
- **Topic 6**
  - **Below level students:**
    - As children begin mental addition, it becomes very important for them to know basic addition facts.

- Provide children performing below level with frequent opportunities to practice their basic addition facts.
- Some children may forget to regroup when adding. Physically acting out the regrouping, using connecting cubes may help.

- **Students with special needs:**
  - Children may have trouble making the next ten using mental addition. Remind them to look at the ones digit and think of the number they add to that to get 10. They can use manipulatives to help them with their calculations.
- **ELL**
  - **Emerging:** Review the meanings of tens digit and next ten with children. Show a two-digit number and point to the tens digit. Say (number name) is in the tens digit. Repeat with other numbers, having children fill in the number name.
  - **Expanding:** Show various two-digit numbers and ask children to name the number and the tens digit. Ask what number added to the number will complete the next ten.
  - **Bridging:** Ask children to choose a two-digit number. Once they have a number in mind, have them talk about the number, telling its name, the names of the tens and ones digits, and how many they would need to add to get to the next ten.
- **Advanced/Gifted:**
  - Children who easily perform mental addition calculations may be able to add greater numbers of more than two addends.

- **Topic 7**
  - **Below level students:**
    - Subtracting mentally requires children to become familiar with a variety of subtraction strategies. Children will benefit from repeated modeling of various subtraction strategies including subtracting tens, and using a hundred chart.
    - Children will better be able to understand the subtraction process if they are asked to explain each step as they use subtraction strategies, write subtraction sentences, and solve subtraction problems.
  - **Students with special needs:**
    - Special needs students may benefit from a review of the terms tens digit and ones digit. Using repeated modeling of these terms might help.
    - Some children may have difficult following the process of subtracting two-digit numbers. Working through the process using manipulatives may help.
    - Children who have difficulty using the hundred chart due to visual processing challenges may benefit from opportunities to use loose connecting cubes to cover the numbers necessary to solve the subtraction problem. For example, when attempting to solve 34-20, children cover 34 with a cube, then move up 2 rows to 14 and cover 14 with a cube.
  - **ELL**
    - Subtraction problem-solving strategies and terminology should be modeled repeatedly.
    - **Emerging:** Model solving subtraction problems by using concrete objects, such as place-value blocks and a hundred chart. Write the subtraction sentence on the board and read it aloud with children.
    - **Expanding:** Share a basic two-digit subtraction story that connects to a real-life situation. On the board, use picture to show the information int he story. Write a subtraction number sentence below the pictures. Read the subtraction number sentence aloud. Repeat this activity with new subtraction sentences.
    - **Bridging:** Write vertical two-digit subtraction sentences on the board. Ask children to

label the tens and ones digits and then subtract the digits.

- **Advanced/Gifted:**
  - Children who easily grasp the mental math concepts may be ready to subtract two-digit numbers that require regrouping. Encourage the use of manipulatives to support this investigation.
  - Repeated practice with the use of mental subtraction strategies will enable children to better understand related facts when working with large numbers.

- **Topic 8**
  - **Below level students:**
    - Provide support for below-level students by reducing simple mechanics that might make it more difficult for children to maintain focus on individual steps.
    - Encourage and support children in experiencing success for each step they master when performing two-digit addition.
  - **Students with special needs:**
    - Experiences and activities that connect symbolic addition sentences to concrete representations can help give symbols and operations meaning for special education students.
    - Provide opportunities for special education students to work with concepts tactilely and visually, as well as symbolically.
  - **ELL**
    - English language learners need to practice the verbal and symbolic language used to describe joining, separating, and comparing actions and part-part-whole representations and extend that language to work with two-digit addition.
    - **Emerging:** Have children regroup loose connecting cubes in amounts, such as 17 and 23, into tens and ones.
    - **Expanding:** Have children give an example of an addition problem in which regrouping is needed.
    - **Bridging:** Have children explain why a sample addition problem does or does not need to be regrouped.
  - **Advanced/Gifted:**
    - Children who easily master two-digit addition will enjoy working with problems that provide them with new or unusual information relevant to their own lives.
    - Provide advanced students with numerous opportunities to use new skills in ways that allow them to analyze and interpret information from their daily experience in different ways.

- **Topic 9**
  - **Below level students:**
    - Review with children who are performing below level how to use cubes to solve the basic subtraction facts. The children will also benefit from daily review of the basic facts using flash cards and games.
    - Some children may have trouble remembering the steps to follow for two-digit subtraction with regrouping. Give these children a reference page with the following question to keep at their desk:
      - What am I subtracting in the ones place?
      - Do I have to regroup?
      - How many ones do I have now?
      - How many tens?

- **Students with special needs:**
  - Some children with special needs may benefit from a review of the basic subtraction facts before working with two-digit subtraction.
  - Children with special needs may find it difficult to visually focus on one exercise at a time. Rewrite the exercise larger on a separate sheet of paper to make it easier for children to complete the exercise.
  - Using tens and ones models, such as connecting cubes, will help children gain a better understanding of the algorithm for two-digit subtraction.

- **ELL**
  - Terms that are used in the two-digit subtraction algorithm will help English language learners remember and understand the steps.
  - **Emerging:** Have children use manipulatives while emphasizing the actions of the two-digit subtraction algorithm.
  - **Expanding:** Model th algorithm for 3 or 4 two-digit subtraction exercises. Ask children to say regroup when regrouping is necessary. When regrouping is not necessary, ask children to say, subtract the ones and then the tens.
  - **Bridging:** Write the words regroup, tens, ones, two-digit, subtract, add, and check on the board. Model the algorithm for two-digit subtraction, having children identify where each of these terms is applied.

- **Advanced/Gifted:**
  - Children who quickly grasp how to use the two-digit subtraction algorithm can learn to use this method when subtracting from three-digit numbers.
  - Provide children with real-life problems to solve using two-digit subtraction, such as finding the difference between temperatures in two cities or the amount of change given after someone purchases art supplies at the art supply store.

- **Topic 10**
  - **Below level students:**
    - Students performing below grade level often have trouble with symbols. Go over the meaning of the inequality signs. Point out that the lines making up the symbol are far apart next to the greater number and come together to point to the lesser number.
  - **Students with special needs:**
    - Review the concept of place value with special needs students. Then relate the concept to comparing multi-digit numbers.
    - Use place-value blocks to help children visualize the meaning of the digits in multi-digit numbers. Reinforce the difference in value between pairs of numbers with the same digits but in a different order, such as 25 and 52, or 193 and 391. Use the concrete models to reinforce the idea that when comparing three-digit numbers, children should compare the hundreds first, the tens next, and finally the ones.

  - **ELL**
    - Helping children integrate the meaning of less than and greater than with both words and symbols will help them to focus on the concept.
    - **Emerging:** Write two numbers on the board and model the numbers. Write the correct symbol between the numbers. Read the number sentence. Then revers the order of the numbers and repeat.
    - **Expanding:** Show three inequalities. Read them together. For each, ask children which is the lesser number. Have children notice that the inequality sign always points to the lesser number.
    - **Bridging:** Show three inequalities. Read them together. Ask children to think of and

share a way to remember which way the symbol should point.

- **Advanced/Gifted:**
  - Children who understand the concept of order with random three-digit numbers can apply their understanding to increasingly larger quantities of three-digit numbers.
  - Remind children to compare hundreds, tens, and ones digits as applicable, then ask them to order larger groups of three-digit numbers.

- **Topic 11**
  - **Below level students:**
    - Children performing below grade level often have trouble using mental math with place-value concepts. Point out that to add three-digit numbers, children can use what they know about place value to help them form an understanding of how numbers relate to each other in three-digit addition and subtraction.
  - **Students with special needs:**
    - Review the concept of regrouping with children experiencing difficulty.
    - You can use place-value blocks to help children visualize how to regroup when adding three-digit numbers. Review with children how they previously regrouped with two-digit addition. Reinforce the fact that when you regroup, you are adding a number from the next lowest place value. Write examples of regrouping with two-digit numbers on the board and have children solve the problems. Show children how they can use place-value blocks to help visualize regrouping.
  - **ELL**
    - **Emerging:** Review the places in a three-digit number and the term digit. Write a three-digit number and have children follow simple directions such as, Point to the digit in the tens place.
    - **Expanding:** Review the term "regroup" by having children illustrate the terms with place-value blocks. For example, have them demonstrate that 16 unit cubes represent the same amount as 1 tens rod and 6 unit cubes.
    - **Bridging:** Many children can follow an explanation more easily than they can give one. Have children explain the process as they estimate and find sums and differences of three-digit numbers. Assist them when needed.
  - **Advanced/Gifted:**
    - Children who are proficient at subtracting three-digit umbers may be ready to consider zeros in the minuend. Provide place-value materials and have children find 502-346.
    - Ask children to find 450-300 using mental math. Then ask how this could help them find 450-299 mentally. Repeat with examples such as 370-200 and 370-199.

Integrated/Cross-Disciplinary Instruction

Reading and Writing: The Worldscapes Readers present math problems to be solved within the context of nonfiction text. Think and Respond and Write Math questions can be found at the conclusion of the books. Language Arts/Science/Social Studies:

- Worldscapes Readers
- Topic Opener Math Projects
- Writing in Math/Math Journals

- Interactive Notebooks

Topic 5: A Fair Bear Share: Art: Students will draw stars that cover an index card. Ring groups of ten. Then write number of stars on their card.p.122

Topic 6: One to One Hundred: Literature: Students will write and illustrate a story that involves counting "10 more". p.156

Topic 7: Elevator Magic: Literature: Research a New Jersey state animal. Have students write a number sentence and a story to describe their subtraction. p. 186

Topic 8: 17 Kings and 42 Elephants: Art: Have students make a field of flowers. Ring groups of ten and find total amount. p. 212

Topic 9: Lights Out:Social Studies: Research information amount cities in New Jersey. Partner and compare information with another student. Then write a number sentence about their research. p.254

Topic 10: How much, how many, how far, how heavy, how long, how tall is 1000? :STEM: Research animal found near a seashore. Then write a number story about their animal. p. 296

Topic 11: Shark Swimathon: Art: Research large marine animals including their weight. Then have pairs of children create a subtraction problem that compares their weights. p. 334

Resources

Topics Categories in book form:

Topic 5: Place Value to 100

Topic 6: Mental Addition

Topic 7: Mental Subtraction

Topic 8: Adding Two-Digit Numbers

Topic 9: Subtracting Two-Digit Numbers

Topic 10: Place Value to 1,000

Topic 11: Three-Digit Addition and Subtraction

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

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.