

04. Addition & Subtraction and Mathematical Models

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **5 weeks**
Status: **Published**

General Overview, Course Description or Course Philosophy

In this unit, students will focus on the following skills and concepts:

- fact power
- money
- open number lines
- number stories and number models

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Enduring Understandings:

- Number sense develops through experience.
- Place value relationships can help simplify mathematical operations and equations.
- Understanding place value can lead to number sense and efficient strategies for computing with numbers.
- Patterns on a hundred chart can be used to add numbers and to develop mental math strategies and number sense.
- Patterns in a hundred chart can be used to subtract numbers and to develop mental math strategies and number sense.
- All sums and differences can be found using models.
- Sums can be represented as lengths on a number line diagram of addition.
- Models can help organize the information presented in number stories.
- Symbols can be used to represent the unknown information in a number story and/or equation.
- There is a connection between the strategy used and a written method or equation.
- A problem solver understands what has been done, knows why the process was appropriate, and can support it with reasons and evidence.
- There can be different strategies to solve a problem, but some are more effective and efficient than others are.

Essential Questions:

- How do I use place value to enhance my addition and subtraction skills and build my number sense?
- How can you use patterns on a hundreds chart to add or subtract two digit numbers?
- In what ways can items be grouped to make exchanges for unit(s) of higher value?
- How can sums be found mentally?
- How can differences be found mentally?
- What is a standard procedure for adding two digit numbers?

- How can models help organize the information in number stories?
- Does my strategy match my written method or equation?
- How does explaining my process help me to understand a problem's solution better?
- How do I decide what strategy will work best in a given problem situation?
- What do I do when I get stuck?
- How do I know when a result is reasonable?

CONTENT AREA STANDARDS

2.OA

A. Represent and solve problems involving addition and subtraction

B. Add and subtract within 20

C. Work with equal groups of objects to gain foundations for multiplication

2.NBT

A. Understand place value

B. Use place value understanding and properties of operations to add and subtract

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
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.K-12.4	Model with mathematics.
MA.K-12.6	Attend to precision.
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.

RELATED STANDARDS (Technology, 21st Century Life & Careers, ELA Companion Standards are Required)

PFL.9.1.2. FI.1	Differentiate the various forms of money and how they are used (e.g., coins, bills, checks, debit and credit cards).
LA.W.2.5	With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.
LA.SL.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
TECH.9.4.2.CI.1	Demonstrate openness to new ideas and perspectives (e.g., 1.1.2.CR1a, 2.1.2.EH.1, 6.1.2.CivicsCM.2). Critical thinkers must first identify a problem then develop a plan to address it to effectively solve the problem.

STUDENT LEARNING TARGETS

- I can illustrate addition within 100 using pictures or other visual representation
- I can describe how to combine two 2-digit numbers using strategies based on:
 - Place value
 - Properties of operations
 - The relationship between addition and subtraction
 - Decomposing and composing numbers
- I can add numbers fluently with:
 - Accuracy (correct answer)
 - Efficiency (a reasonable number of steps and amount of time)
 - Flexibility (using various strategies)
- I can illustrate subtraction within 100 using pictures or other visual representation
- I can describe how to subtract two 2-digit numbers using strategies based on:
 - Place value
 - Properties of operations
 - The relationship between addition and subtraction
 - Decomposing and composing numbers
- I can subtract numbers fluently with:
 - Accuracy (correct answer)
 - Efficiency (a reasonable number of steps and amount of time)
 - Flexibility (using various strategies)
- I can illustrate addition of a string of two-digit numbers using pictures or other representation
- I can describe how to add up to four two-digit numbers using strategies based on:
 - Place value
 - Properties of operations
- I can illustrate addition of a string of two-digit numbers using pictures or other representation
- I can describe how to add up to four two-digit numbers using strategies based on:
 - Place value

- Properties of operations
- I can explain for any problem involving adding and subtracting within 1000:
 - The reasoning used to solve the problem
 - The connection between the strategy used and a written method or equation
- I can represent adding within 1000 using any combination of models, drawings, words, pictures, or objects
- I can describe the strategy used to add numbers within 1000
 - (e.g. strategies should be based on place value, properties of operations, and/or the relationship between addition or subtraction)
- I can represent subtracting within 1000 using any combination of models, drawings, words, pictures, or objects
- I can describe the strategy used to subtract numbers within 1000
 - (e.g. strategies should be based on place value, properties of operations, and/or the relationship between addition or subtraction)
- I can use mental strategies (e.g., number patterns, counting on, mental images of blocks, number lines, etc.) to add 10 or 100 to a given number
- I can explain how to mentally find 10 or 100 more than a given number without counting to quickly solve a problem
- I can use mental strategies (e.g., number patterns, counting back, mental images of blocks, number lines, etc.) to subtract 10 or 100 from a given number
- I can explain how to mentally find 10 or 100 less than a given number without counting to quickly solve a problem
- I can use drawings, objects, and words to describe why addition strategies using place value and the properties of operations work to solve problems
- I can use drawings, objects, and words to describe why subtraction strategies using place value and the properties of operations work to solve problems
- I can decide which operation is needed to solve one-step word problems
- I can solve for the unknown number in one-step word problems within 100 in the following situations:
 - Add to/Taking from (e.g., the result, the change, or the start addends could be unknown)
 - Put together/Taking apart (e.g., the total, either addend, or both addends could be unknown)
 - Comparing (e.g., the difference, the bigger addend, or smaller addend could be unknown)
- I can explain how to solve addition or subtraction situations or word problems within 100
- I can make sense of problems and persevere in solving them
- I can write addition or subtraction equations using a symbol to represent an unknown value
- I can represent various addition and subtraction situations (e.g., using cubes, place value materials, ten frames, number lines, drawings, equations, etc.) to solve one-step and two-step word problems within 100

Declarative Knowledge

Students will understand that:

- strategies based on place value, properties of operations, and/or the relationship between addition and

subtraction are used to add and subtract fluently.

- explanations and number models are necessary to display one's addition and subtraction thinking.
- it is essential to attend to precision by reviewing one's work.
- the unknown can be in all positions in a variety of situations.
- organizing the information presented in a number story can make solving it more effective and efficient.
- place value can be used to mentally add and subtract 10 or 100 to a given number from 100-900.

Procedural Knowledge

Students will be able to:

- Add fluently within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Subtract fluently within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- Add up to four two-digit numbers using strategies based on place value and properties of operations.
- Add up to four two-digit numbers using strategies based on place value and properties of operations.
- Relate the strategy used to add and subtract within 1000 to a written method.
- Add within 1000 using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
- 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.
- Mentally add 10 or 100 to a given number from 100-900.
- Mentally subtract 10 or 100 to a given number from 100-900.
- Explain why addition strategies work using place value and the properties of operations.
- Explain why subtraction strategies work using place value and the properties of operations to add and subtract.
- Solve one-step word problems that use addition and subtraction within 100 involving various situations with unknowns in all positions.
- Write a symbol for the unknown number to represent one-step problems.

EVIDENCE OF LEARNING

Refer to the 'Formative, Summative, and Benchmark Assessments' sections.

Alternate Assessments

- Portfolios

- Verbal Assessment (instead of written)
- Multiple choice

Formative Assessments

- Journal Pages
- Self-Assessments/Student Friendly Scales
- White board responses
- Exit/Entrance Tickets
- Math Talks
- Open Response

Summative Assessments

- End of Unit Assessment
- Fact Fluency Assessments
- End of Unit Self Assessment

Benchmark Assessments

- EDM BOY Assessment
- IXL Screener / Diagnostic Snapshot BOY
- IXL Diagnostic Snapshot MOY
- IXL Diagnostic Snapshot EOY

RESOURCES (Instructional, Supplemental, Intervention Materials)

Core Instructional Materials:

- Everyday Math Grade 2 Unit 5 Resources
 - Math Masters
 - Student Journal Volume 1
 - [ConnectED](#)

Supplemental Materials:

- [IXL](#)

- Illustrative Math Tasks
- EM Games
- Calendar Math

Lessons:

- 5-1
- 5-2
- 5-3
- 5-4
- [Independent Problem Solving 5a](#)
- 5-6
- 5-7
- 5-8
- 5-9
- 5-10
- [Independent Problem Solving 5b](#)
- 5-11

Calendar Math- Money skills

[Open Number Line Practice](#)

[Tim's Bakery](#)

Illustrative Math Task- Many Ways to do Addition 2: <http://tasks.illustrativemathematics.org/content-standards/2/NBT/B/7/tasks/1628>

Illustrative Math Task- Ford and Logan Add $45+36$: <http://tasks.illustrativemathematics.org/content-standards/2/NBT/B/5/tasks/2068>

INTERDISCIPLINARY CONNECTIONS

ELA:

Writing- Lesson 5-11

Career Readiness: Utilize Critical Thinking to Make Sense of Problems and Persevere in Solving Them

- Career Readiness: Utilize Critical Thinking to Make Sense of Problems and Persevere in Solving Them
- Technology/Multimedia: Educational Tech Application
- Science & Health: Social Emotional Learning

- Social Studies: Topography
- Visual Performing Arts: Dramatization

LA.W.2.5

With guidance and support from adults and peers, focus on a topic and strengthen writing as needed through self-reflection, revising and editing.

ACCOMMODATIONS & MODIFICATIONS FOR SUBGROUPS

- simplify written directions
- visuals
- manipulatives
- graphic organizers
- sentence starters
- wait time
- additional time for tasks
- verbal responses
- illustrations
- colored number grids

See link to Accommodations & Modifications document in course folder.