

05. Whole Number Operations

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:

- one and two step number stories
- strategies for addition of 2 and 3-digit numbers
- strategies for subtraction of 2 and 3-digit numbers

OBJECTIVES, ESSENTIAL QUESTIONS, ENDURING UNDERSTANDINGS

Enduring Understandings:

- There are a variety of ways to add three digit numbers.
- Three and four two-digit numbers can be grouped and added in any order.
- When adding it may be necessary to rename 10 ones as 1 ten.
- One ten can be regrouped for 10 ones.
- Two-digit numbers can be broken apart using tens and ones and added in different ways.
- To find parts of 100, add on ones to make a ten and count on by tens to reach 100.
- All sums and differences can be found using models (cubes).
- Sums can be represented as lengths on a number line diagram of addition.
- Differences can be represented as lengths in a number line diagram of subtraction.
- Some strategies can be more efficient than others when adding and subtracting 2 and 3-digit numbers.
- The standard subtraction algorithm breaks the calculation into simpler calculations starting with the ones and then the tens.
- The standard addition algorithm for two-digit and one-digit numbers breaks the calculations into simpler calculations using place value, starting with the ones and then the tens.
- The inverse relationship between addition and subtraction can be used to check subtraction.
- A symbol can represent an unknown.
- The unknown may be located in any position in the equation.
- Mathematical thinking must be communicated with clarity.

Essential Questions:

- How does understanding place value help you solve double digit addition and subtraction problems?
- What is a standard procedure for adding two and three digit numbers?
- What is a standard procedure for subtracting two and three digit numbers?
- How does breaking apart a number make adding easier?
- How do you break apart addends to add tens and then add ones?
- How does breaking apart a number make subtracting easier?

- When do you regroup in addition?
- When do you regroup in subtraction?
- How can I use what I know about number relationships to develop efficient strategies for adding/subtracting multi-digit numbers?
- How can I estimate the answers for operations involving two and three digit numbers?
- What are the different ways of communicating mathematics with clarity?
- How can I work with precision and accuracy?
- How can you use manipulatives to solve a problem?
- How can drawing a diagram help you solve a problem?
- How do I decide what strategy will work best in a given problem situation?
- What do I do when I get stuck?

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.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.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.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.

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

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.
PFL.9.1.2.PB	Planning and Budgeting
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).

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 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 describe the process used to add or subtract
 - Hundreds and hundreds
 - Tens and tens
 - Ones and ones

- I can decompose any number within 1000 into hundreds, tens, and ones.
- I can explain the composition or decomposition strategies used to add or subtract three-digit numbers to (e.g., making a ten, making a 100, breaking apart a 10, breaking apart a 100, creating an easier problem).
- I can use models, drawings, or place value blocks to show how to compose or decompose tens or hundreds.
- I can use drawings, objects, and words to describe why addition and 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 decide which operations are needed to solve two-step word problems.
- I can solve for the unknown number in two-step word problems within 100 in the following situations:
 - Add to/Taking from (e.g., the result or the change could be unknown)
 - Put together/Taking apart (e.g., the total, either addend, or both addends could be unknown)
 - Comparing (e.g., the difference is unknown)

- I can explain how to solve a two-step word problem when both operations are the same.
- I can explain how to solve a two-step word problem when the operations are opposite.
- 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.
- I can make sense of problems and persevere in solving them.
- I can work with precision and accuracy.

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 fluently within 100.
- strategies based on place value, properties of operations, and/or the relationship between addition and subtraction are used to subtract fluently within 100.
- concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction are used to add within 1000.
- concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction are used to subtract within 1000.

- when adding or subtracting three-digit numbers means adding or subtracting hundreds and hundreds, tens and tens, ones and ones.
- when adding or subtracting three-digit numbers it is sometimes necessary to compose or decompose tens or hundreds.
- strategies based on place value and properties of operations are used to add up to four two-digit numbers.
- diagrams can be used to organize the information in one-step word problems.
- math explanations are used to defend and explain one's math thinking.
- the unknown in a word problem can be in a variety of positions.

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 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.
- Compose and decompose tens or hundreds
- 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.
- Solve one-step word problems that use addition and subtraction within 100 involving various situations with unknowns in all positions.
- Solve two-step word problems that use addition and subtraction within 100 involving various situations with unknowns in all positions.
- Use drawings and equations with a symbol for the unknown number to represent one-step or two-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
- Party Planning Activity

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 6, 7, & 9 Resources
 - Math Masters
 - Student Journal Volume 1
 - [ConnectED](#)

Supplemental Materials:

- [IXL](#)
- Illustrative Math Tasks
- EM Games
- Calendar Math

Lessons:

- 6-6
- 6-7
- 6-7
- 7-1
- [\(Independent\) Problem Solving 7a](#)
- 7-2
- 7-3
- 7-4
- 9-6
- 9-7
- 6-2
- 6-3
- 6-4
- 6-5
- [Independent Problem Solving 6a](#)
- 6-9

Supplemental Resources:

- Illustrative Math- Saving Money 2
- Illustrative Math- How Many Days Until Summer Vacation? <https://tasks.illustrativemathematics.org/content-standards/2/NBT/B/7/tasks/1063>
- Graham Fletcher 3 Act Task- Downsizing Tomatoes <https://gfletchy.com/downsizing-tomatoes/>
- Graham Fletcher 3 Act Task- Let it Fly Graham Fletcher 3 Act Task-
- Supplemental Materials for Subtraction

INTERDISCIPLINARY CONNECTIONS

ELA:

Writing- Lesson 6-9 & 7-3

Personal Finance:

Culminating Party Planning Assessment

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

Them

- Technology/Multimedia: Educational Tech Application
- Financial/Economic/Business/Entrepreneurial Literacy
- Visual Performing Arts: Dramatization
- English/Language Arts: Narrative Writing
- Social Studies: Topography

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.

PFL.9.1.2.PB

Planning and Budgeting

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.