Grade 2 Math Unit 1

Content Area: **Mathematics**
Course(s):
Time Period: **Trimester 1**
Length: **59 Days**
Status: **Published**

Brief Summary of Unit

In this unit, students will build on the foundations laid in Grade 1 for applying mental math strategies for addition and subtraction within 20. They will be refining their understanding of the commutative and associative properties. Students will then represent and solve one-step word problem situations using pictures, models and equations. Fact families become a structure for finding an unknown as students learn to recognize the relationship between the difference in a subtraction equation and an addend in an addition equation. Students will also explore data by organizing and representing data in more than one day. They will recognize the kinds of data that are represented by picture graphs and bar graphs and use data to solve put-together, take-apart, and compare problems within 20. Students will expand on what they have learned about solving one-step word problems by seeing a two-step problem as a sequence of one-step word problems. Toward the end of the unit, the students will learn to add two-digit numbers that require composing a ten. They will also learn to subtract two-digit numbers by counting back to a ten and by decomposing a ten. Students will become fluent in two-digit addition and subtraction using a variety of strategies. Students will finally interpret and solve one- and two-step word problems that involve two-digit numbers by using models such as number bonds, bar models, open number lines, and equations.

Revision Date: August 2024

Essential Questions

Essential Questions:

- How does numerical reasoning involve fluency and facility with numbers?
- How does taking apart and combining numbers using a variety of strategies help in computation?
- What strategies can help us when adding and subtracting with regrouping?
- How can bar graphs and picture graphs be used to organize data and answer questions?

Enduring Understandings:

- Students will understand and use the relationship between addition and subtraction to add and subtract one-digit numbers within 20 and two two-digit numbers within 100.
- Students will understand how to organize and analyze data within a tally chart, bar graph, and picture graph and solve problems based on the data.
- Students will begin to foster their understanding of regrouping and decomposing to find sums and differences.

Students Will Know

Students will know:

- How to add and subtract within 20 using mental strategies
- How to use fact families as a strategy to solve one-step problems and build number sense
- How to interpret models that represent one-step problems
- How to collect data to display in a bar graph or picture graph
- How to create a bar graph from a given set of data
- How to analyze two-step addition and subtraction word problems to determine the series of operations needed to solve them
- How to interpret models that represent a two-step problem
- How to determine when grouping a ten is necessary and carry out the regrouping to find a sum
- How to recognize that addition can be used to solve a subtraction problem
- How to evaluate mental strategies for subtracting a number from a two-digit number
- How to fluently determine when regrouping a ten is necessary and carry out the regrouping to find a sum
- How to fluently determine when decomposing a ten is necessary and carry out the decomposition to find a difference
- How to analyze word problems to determine the operation needed to solve them.
- How to apply the use of fact families as a strategy to solve one-step problems and build number sense

Students Will Be Skilled At

Students will be skilled at:

- Using mental math strategies of counting on, making a ten, and doubles plus one to add two one-digit numbers within 20
- Using mental math strategies of counting on, making a ten, and fact families to subtract two one-digit numbers within 20
- Interpreting models such as pictures, equations, and open number lines that represent the reasoning

behind various strategies

- Analyzing one-step addition and subtraction word problems and write equations to represent the problems
- Using addition strategies to represent and solve word problems
- Comparing data in a tally chart, table, picture graph, and bar graph
- Interpreting graphs by reading and comparing the data shown in the graph
- Completing a picture graph and bar graph
- Solving addition and subtraction word problems within 20, based on data
- Breaking apart two-digit numbers into tens and ones as a place-value strategy for adding
- Recognizing that in adding, tens are added to tens and ones to ones
- Decomposing a ten as a strategy for subtraction
- Fluently breaking apart two-digit numbers into tens and ones as a place-value strategy for addition and subtraction
- Using addition to solve a subtraction problem
- Using addition to check the solution to a subtraction problem
- Interpreting models that represent a one-step problem with two-digit numbers

Learning Plan

Daily Warm-ups (5-10 minutes):

*As an opening to each math lesson, the instructor can use these different routines

- Number Talks- District Created Number Talk Slides
- Quick Images- This routine helps students to subitize, or “instantly see how many”. The teacher should briefly show an image of a quantity (using dot cards, ten frames, etc.). Students are then asked to identify the quantity they saw and to describe the image.
- Number Strings- This routine helps to build students’ mental math capabilities. The teacher writes a problem horizontally on the board in a whole group or small setting. The students mentally solve the problem and share with the whole group how they solved it. They must justify and defend their reasoning. The teacher records the students’ thinking in an open number line and poses extended questions to draw out deeper understanding for all. The teacher can have students share other students’ strategies to the whole group or with turn and talk. Eventually provide a few number sentences on the board to solve within 20 and model how you can use mental math strategies to solve them in a snap similar to how they would on a fact test. Then, let them try solving in a snap as you point to each

number sentence.

- Buzz- Have students stand in a large circle around the room. Students will count around the room. However, one number will be the "Buzz Number." When a student says the "Buzz Number," that child is "out" and will sit down. Then, the counting sequence begins again. Keep playing until there is only one student left.

- Partner Counting- The first partner will tell their partner a number to start counting from. The partner will start counting. Using hand signals, the first partner can signal their partner to stop counting. Then, begin counting backward and then forward again. (Hand signals: Fist = Stop, Pointing up = Count Up, Pointing Down= Count Down) They can count for 30 seconds and then switch partner roles.

- Counting Around the Room- Have students stand in a large U-Shape around the room (each child should be able to see the board). Have the students count around the room by a particular number. (If counting by tens, the first person says "17", the next person says "27", the next "37", and so forth). Have students discuss the pattern of the numbers. While the students are counting, the teacher can be writing the numbers on the board as the students say each number for a visual to help with scaffolding and discussion. Take note of the patterns of each place value in the discussions.

*Second Graders need to be fluent in adding and subtracting within 20. This is a skill that should be worked on throughout the year utilizing the Ready Math Program and supplemental resources that are located under materials.

1. Before teaching Lesson 1, instructor can review necessary prerequisite skills to prepare for the upcoming school year and familiarize students with routines

    a. Complete Lesson 0: Lessons for the First Five Days to familiarize students with the flow of the Try-Discuss-Connect instructional routine that will be used throughout the year.

    b. Review:

        i. Breaking apart numbers using number bonds

        ii. Mental Math Strategies for Addition and Subtraction within 10

        iii. Fact Families within 10 (4+5=9, 5+4=9, 9-5=4, 9-4=5)

2. **Mental Math Strategies for Addition-** Instruct students to build on the foundations laid in Grade 1 for applying mental strategies to addition within 20. Instruct students to refine their understanding of the commutative and associative properties. This is a skill that should be worked on throughout the year as students will gain fluency as they progress through the year.Students should be instructed to add within 20 using mental strategies with accuracy and efficiency.

    a. **Complete Ready Math Lesson 1, Sessions 1-5** (5 days)

    b. Mental Math Strategies to Teach:

        i. Counting On: 8 + 6 = ____ "…9…10…11…12…13…14"

        ii. Making a Ten: 8 + 6 = ___ "8 + 2 + 4 = 10 + 4 = 14"

        iii. Doubles: 6+6 = 12, 7+7=14, 8+8=16, 9+9=18, 10+10=20

iv. Doubles plus 1: 8 + 9 = ___ "8 + 8 = 16 + 1 = 17

c. Lesson Vocabulary: add, equation, open number line, sum, unknown number, addend, count on

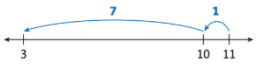
3. **<u>Mental Math Strategies for Subtraction-</u>** Instruct students to build on the foundations laid in Grade 1 for applying mental strategies to subtraction within 10 and draw from the mental strategies for addition in lesson 1. Instruct students to refine their understanding of making a ten to subtract, counting on to subtract, and using related addition facts to solve a subtraction problem. This is a skill that should be worked on throughout the year as students will gain fluency as they progress through the year. Students should be instructed to subtract within 20 using mental strategies with accuracy and efficiency.

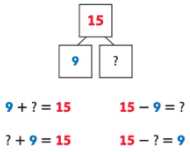
   ***OPTIONAL**: Instructors can prepare for this lesson by reviewing subtraction within 20 to support students as they deepen their understanding of the relationship between addition and subtraction. (Grade 1, Lesson 15- Make a Ten to Subtract) (0-2 days)

   a. **Complete Ready Math Lesson 2, Sessions 1-5** (5 days)

   b. Mental Math Strategies to Teach:

      i. Open Number Line

      ii. Counting On: 11 - 8 = ____ Think: 8 + ___ = 11? "8…9…10…11" 

      iii. Making a Ten: 11-8 = ____ → 11 - 1 = 10, 10 - 7 = 3 

      iv. Using Fact Families:

   c. Lesson Vocabulary: difference, fact family, equation, open number line, subtract

4. Students should be instructed to add within 20 using mental strategies with accuracy and efficiency.

   a. **Complete Ready Math Lesson 1, Sessions 1-5** (5 days)

5. Students should be instructed to add within 20 using mental strategies with accuracy and efficiency.

   a. **Complete Ready Math Lesson 1, Sessions 1-5** (5 days)

6. **<u>Solve One-Step Word Problems</u>**- Instruct students to represent and solve one-step word problem situations using pictures, models, and equations. Use Fact Families as a structure for finding an unknown. Students should be taught to recognize the relationship between the difference in a subtraction equation and an addend in an addition equation.

   a. **Complete Ready Math Lesson 3, Sessions 1-5** (5 days)

   b. Word Problem Types to Teach:

      i. Add to: Change Unknown & Start Unknown

      ii. Take from: Change Unknown & Start Unknown

iii. Take-Apart: Part Unknown

iv. Comparison: Difference Unknown, Bigger Unknown, Smaller Unknown

c. Lesson Vocabulary: equal sign, equation

7. **Draw and Use Bar Graphs and Picture Graphs**- Instruct the students to organize data into a tally chart and table in order to use it for making a graph. Students should represent the data in both a picture graph and bar graph, using a scale in a one-to-one correspondence with the data. Instruct students to recognize the relationship of the two forms of graphs and how the shape of the data is consistent when in either form. Students should be taught to understand that people collect data to answer questions and that data can vary. Instruct students on how to identify what would count as data such as visuals, sounds, and numbers.)

    a. **Complete Ready Math Lesson 4, Sessions 1-5** (2-5 days)

    b. Types of Graphs to Teach and Analyze:

        i. Bar Graphs

        ii. Picture Graphs

        iii. Tally Charts

    c. Lesson Vocabulary: bar graph, picture graph, data

8. **Solve Two-Step Word Problems**- Instruct students to solve two step problems using pictures, diagrams, and an open number line and then describe the situation as an equation.

    a. **Complete Ready Math Lesson 5, Sessions** 1-5 (5 days)

    b. Strategies to Solve Two-Step Word Problems:

        i. Draw a picture

        ii. Bar Model

        iii. Open Number Line

    c. Lesson Vocabulary: Review: count on, subtract

9. ***OPTIONAL:** Prepare for Ready Math Lessons 6-9 by reviewing place value concepts to support students as they expand their skills with adding and subtracting two-digit numbers. (Grade 1 Lesson 21, Grade 1 Lesson 27, Grade 1 Lesson 29) (0-6 days)
10. **Add Two-Digit Numbers-** Instruct students to add two-digit numbers that require composing a ten. Students should be taught to break apart numbers into tens and ones and record the addition of partial addends before calculating the sum. Students should be interpreting picture models, number models, and open number lines to understand addition of two-digit numbers. Students should be instructed to add within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction with accuracy and efficiency.

    a. **Complete Ready Math Lesson 6, Sessions 1-5** (5 days)

b. Strategies to Solve Adding Two-Digit Numbers:

   i. Use base-ten blocks

   ii. Break apart numbers into tens and ones

   iii. Open Number Line

c. Lesson Vocabulary: regroup, sum (review)

11. **Subtract Two-Digit Numbers**- Instruct students to subtract a two-digit number from another two-digit number by counting back to a ten and by decomposing a ten. Students should be taught to interpret picture models, number models, and open number lines to understand subtraction of two-digit numbers. Students should be instructed to subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction with accuracy and efficiency.

    a. **Complete Ready Math Lesson 7, Sessions 1-5** (5 days)

    b. Strategies to Solve Subtracting Two-Digit Numbers:

       i. Use Base-Ten Blocks

       ii. Open Number Line

       iii. Adding Up

       iv. Subtracting to Make a Ten

    c. Lesson Vocabulary: (review) difference, regroup

12. **Use Addition and Subtraction Strategies with Two-Digit Numbers-** Instruct students to compose and decompose tens and apply inverse operations to find sums and differences to help students build fluency with addition and subtraction of two-digit numbers. Guide students to use and explain picture models, number models, open number lines, and equations for addition and subtraction problems. Instruct students to check their solutions to subtraction problems by using the inverse operation of addition. Students should be instructed to add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction with accuracy and efficiency.

    a. **Complete Ready Math Lesson 8**, Sessions 1-5 (5 days)

    b. Strategies to Focus On:

       i. Draw Tens and Ones (lines for tens, dots for ones)

       ii. Add Up: 65 - 27 = ____ can be solved by solving 27 + ___ = 65

       iii. Check your answers to subtraction problems by using addition

    c. Lesson Vocabulary: (Review) difference, regroup, sum

13. **Solve Word Problems with Two-Digit Numbers**- Instruct students to interpret and solve one- and two-step word problems involving two-digit numbers. Students should be taught to utilize concepts of

fact families by representing a problem using more than one equation. Students will be building fluency with representing and solving word problems and using models such as number bonds, bar models, open number lines, and equations.

a. **Complete Ready Math Lesson 9**, Sessions 1-5 (5 days)

b. Strategies to Focus On:

i. Thinking of story problems as: You start with a number, change happens, and you end with a total.

c. Lesson Vocabulary to Review: difference, sum

Note: The instructor is encouraged to consult the supplemental resources located under materials to personalize and differentiate instruction for students, as well as address any learning gaps based on formative assessments.

Evidence/Performance Tasks

Formative Assessment:

- Fact Fluency Practice Assessments
- Administer Ready Math Lesson Quizzes at the end of each Lesson
- Administer Comprehension Check (digital)

Summative Assessments:

- Administer Ready Math Mid-Unit Assessments
- Administer Ready Math End of Unit Assessments

Benchmark Assessments:

- iReady Diagnostic
- Fact Fluency Assessment
- Acadience Assessment

Alternative Assessments:

- Informal Observation
- Small Group Observation
- Exit Tickets

- Math Journal
- Oral and Written Explanations of Reasoning

Materials

The following are approved resources that teachers can include to further unit related objectives:

Core Book List

- Ready Math Teacher Toolbox Resources
    - Whole Class Instruction
        - Teach: Instruction & Practice, Interactive Tutorials
        - Assess: Lesson Quizzes & Unit Assessments
    - Small Group Differentiation
        - Prepare: Prerequisite Lessons
        - Reteach: Tools for Instruction
        - Reinforce: Math Center Activities
        - Extend: Enrichment Activities
- Ready Math Workbook
- Ready Math Slides
- Digital Math Tools
- iReady My Path
- iReady Math Learning Games
- Manipulatives: two-color counters, tens frames, connecting cubes, base 10 blocks
- Dry Erase boards
- Number paths
- Hundred charts
- Blank Bar Models
- Grid Paper

- Blank Number Bonds
- CPS District Mathematics Google Drive Folder

Any additional resources that are not included in this list will be presented to and reviewed by the supervisor before being included in lesson plans. This ensures resources are reviewed and vetted for relevance and appropriateness prior to implementation.

Standards

Diversity and Inclusion: Students will focus on equity, inclusion, and tolerance when analyzing the comparison of various quantities regarding characteristics of people. Equality will also be highlighted which can be associated with both numerical representations and the connection between people. This can be associated with treating people fairly and equally.

9.4.5.CI	Creativity and Innovation
P.1	Act as a responsible and contributing community members and employee.
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
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.
P.4	Demonstrate creativity and innovation.
3	Construct viable arguments and critique the reasoning of others
2.OA.B.2	With accuracy and efficiency, add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.
P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
4	Model with mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
L.RF.2.4.C	Use context to confirm or self-correct word recognition and understanding, rereading as necessary.
2.NBT.B.5	With accuracy and efficiency, add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.NBT.B.9	Explain why addition and subtraction strategies work, using place value and the properties of operations.

2.DL.A.1	Understand that people collect data to answer questions. Understand that data can vary.
2.DL.A.2	Identify what could count as data (e.g., visuals, sounds, numbers).
2.DL.B.4	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put together, take-apart, and compare problems using information presented in a bar graph.
SL.PE.2.1	Participate in collaborative conversations with diverse partners about grade 2 topics and texts with peers and adults in small and larger groups.
SL.PE.2.1.A	Follow agreed-upon norms for discussions (e.g., gaining the floor in respectful ways, listening to others with care, speaking one at a time about the topics and texts under discussion).
SL.PE.2.1.B	Build on others' talk in conversations by linking their explicit comments to the remarks of others.
SL.PE.2.1.C	Ask for clarification and further explanation as needed about the topics and texts under discussion.

Suggested Strategies for Modification

Possible accommodations/modification for Grade 2

Note: Teachers can find more specific modifications for English learners, learners with special needs,learners reading below grade level, and advanced learners on the Ready Math website.