1st Grade Mathematics

UNIT 1: Relating Addition and Subtraction

ESSENTIAL QUESTION	BIG IDEAS
How are addition and subtraction related?	Students work with number partners for 10. Students use what they know about addition problems to help them solve subtraction problems. Students understand and solve addition and subtraction word problems up to 10.

GUIDING QUESTIONS

Content and Process

- How can someone connect the meaning of models and symbols to contexts of word problems? **1.OA.1**
- Why does showing and describing the actions in word problems using physical models, visual models, and symbols help students? **1.OA.1**
- Explain how to find missing number partners for 10 when one number is known. **1.OA.3**
- Why does the order of addends not change the total of 10? **1.OA.3**
- When efficient, how can using a count-on strategy be used to solve a subtraction problem? **1.OA.4**
- What is a fact family? **1.OA.4**
- How can someone identify, write and use related addition and subtraction equations to solve subtraction problems? **1.OA.5**
- How can number partners for 10 be recognized and shown on models, such as a 10-frame and number bond? **1.OA.6**
- How can objects, drawings, and equations be used to represent and solve addition and subtraction problems within 10? **1.OA.6**
- How can the strategy of count on be used to add? **1.OA.6**
- How can the strategy of count back be used to subtract? **1.OA.6**

Reflective

- What strategies can you use to solve addition and subtraction word problems?
- How can I use addition and subtraction to solve the same math problem?
- How can equations be connected physically and visually involving number partners for 10?
- How can you connect the meaning of models and symbols to the contexts of word problems?
- What is the relationship between addition and subtraction?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.1 Make sense of problems and persevere in solving them.

Standards

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, *(e.g. by using objects, drawings, and situation equations and/or solution equations with a symbol for the unknown number to represent the problem.)*

1.OA.3 Apply (not necessary to name) properties of operations as strategies to add and subtract. *Examples: is known, then is also known. (Commutative property of addition.) To add , the second two numbers can be added to make a ten, so . (Associative property of addition.) To add 0 to any number, the answer is that number (Additive identity property of 0).* Students need not use formal terms for these properties.

1.OA.4 Understand subtraction as an unknown-addend problem. *For example, subtract* 10 - 8 *by finding the number that makes 10 when added to 8.*

Result Unknown	Change Unknown	Start Unknown
There are 9 students on the playground. Then 8 more students showed up. How many students are there now? $9 + 8 = ?$	There are 9 students on the playground. Some more students showed up. There are now 17 students. How many students came? $9 + ? = 17$	Here are some students on the playground. Then 8 more students came. There are now 17 students. How many students were on the playground at the beginning? $? + 8 = 17$

1.OA.5 Relate counting to addition and subtraction (*e.g. by counting on 2 to add 2, counting back 1 to subtract.)*

1.OA.6 Add and subtract within 20, demonstrating fluency (efficiently, accurately, and flexibly) for addition and subtraction within 10. Use mental strategies such as counting on; making *ten (e.g.)*; decomposing a number leading to a ten*(e.g.);* using the relationship between addition and subtraction *(e.g. knowing that , one knows*); and creating equivalent but easier or known sums *(e.g. adding by creating the known equivalent.)*

1st Grade Mathematics

UNIT 2: Addition and Subtraction Within 20

ESSENTIAL QUESTION	BIG IDEAS
How do place value patterns help us understand our number system?	Students recognize 10 as an important number. Students can break apart numbers and put them together in different ways to help them add and subtract. Students can use what they know about adding and subtracting up to 10 to add and subtract up to 20.

GUIDING QUESTIONS

Content and Process

- How can 10 ones be thought of as a group of 10, called a ten? **1.NBT.2a**
- How can teen numbers be composed and decomposed into a ten and some ones with concrete objects and other visual representations, as well as with words and numbers? **1.NBT.2b**
- How can someone find the total of three addends using strategies such as finding number partners for 10 and using doubles facts by grouping any two addends? **1.OA2**
- How can an addition equation be written with three addends to represent problems? **1.OA.2**
- How can the associative and commutative properties be used to group addends strategically in order to use additional strategies or known facts? **1.OA.3**
- Why is 10 a useful benchmark that makes adding easier? **1.OA.6**
- How can totals for doubles facts within 20 be found? **1.OA.6**
- How can doubles facts be used to solve near doubles facts within 20? **1.OA.6**
- How are doubles shown as two equal groups, and how are near doubles related to doubles? **1.OA.6**

Reflective

- How can I organize and group objects to help me count the total number in a set?
- Why is using a 10 as a benchmark number when subtracting from teen numbers in parts a good strategy to use?
- Why does the value of numbers not change when the numbers are broken apart and put together in a new way?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.8 Look for and express regularity in repeated reasoning

Standards

1.OA.2 Solve word problems that call for addition of three whole numbers whose sum is less than or equal to 20, *(e.g. by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.)*

1.OA.3 Apply (not necessary to name) properties of operations as strategies to add and subtract. *Examples: is known, then is also known. (Commutative property of addition.) To add , the second two numbers can be added to make a ten, so . (Associative property of addition.) To add 0 to any number, the answer is that number (Additive identity property of 0).* Students need not use formal terms for these properties.

1.OA.6 Add and subtract within 20, demonstrating fluency (efficiently, accurately, and flexibly) for addition and subtraction within 10. Use mental strategies such as counting on; making *ten (e.g.)*; decomposing a number leading to a ten (*e.g.);* using the relationship between addition and subtraction *(e.g. knowing that , one knows*); and creating equivalent but easier or known sums *(e.g. adding by creating the known equivalent*

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- **1.NBT.2a** 10 can be thought of as a grouping of ten ones—called a “ten.”
- **1.NBT.2b** The numbers from 11 to 19 are composed of a ten and one, two, three, four, five, six, seven, eight, or nine ones.

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UNIT 3: Solving Word Problems and Making Comparisons

ESSENTIAL QUESTION	BIG IDEAS
How can students use math vocabulary to describe word problems, data, and equations?	Students use addition and subtraction relationships to find differences between quantities. Students ask questions that can be answered by collecting, representing, and comparing data. Students can use objects, drawings, numbers, and symbols to show their thinking about word problems. Students understand the equal sign is a symbol that describes the relationship between quantities.

GUIDING QUESTIONS

Content and Process

- How can stories relate to known and missing values? How can they be represented using equations? **1.OA.1**
- How are concrete and visual models used to represent compare situations? **1.OA.1**
- How can related addition and subtraction equations be used to solve compare word problems? **1.OA.1**
- How can using related equations help to check work? **1.OA.4**
- How can strategies be chosen to solve equations? **1.OA.6**
- What does the equal sign tell us about the relationship between both sides of an equation? **1.OA.7**
- How can models be used to show two sides of an equation are equal? **1.OA.7**
- Determine if equations are true or false. **1.OA.8**
- How can the unknown number in any position in an addition or subtraction equation be found? **1.OA.8**
- How can data be collected and organized to represent the data with charts and graphs? **1.MD.4**
- How is a data display used to compare categories? **1.MD.4**

Reflective

- How can I convince a friend that an equation is true or false?
- How can I use what I know about the equal sign to solve a missing-number equation?
- How can understanding data help me explain the world around me?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.3 Construct viable arguments and critique the reasoning of others.

Standards

1.OA.1 Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, *(e.g. by using objects, drawings, and situation equations and/or solution equations with a symbol for the unknown number to represent the problem.)*

1.OA.4 Understand subtraction as an unknown-addend problem. *For example, subtract by finding the number that makes 10 when added to 8.*

1.OA.6 Add and subtract within 20, demonstrating fluency (efficiently, accurately, and flexibly) for addition and subtraction within 10. Use mental strategies such as counting on; making *ten (e.g.)*; decomposing a number leading to a ten *(e.g.);* using the relationship between addition and subtraction *(e.g. knowing that , one knows*); and creating equivalent but easier or known sums *(e.g. adding by creating the known equivalent.*

1.OA.7 Understand the meaning of the equal sign (the value is the same on both sides of the equal sign), and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false?* 6 = 6; 7 = 8 - 1; 5 + 2 = 2 + 5; 4 + 1 = 3 + 2; 7 - 1 = 4 + 2; 5 + 4 = 7 - 2.

1.OA.8 Using related equations, determine the unknown whole number in an addition or subtraction equation. *For example, determine the unknown number that makes the equation true in each of the equations*

$\Delta - 3 = 7;\ 7 + 3 = \Delta.$

1.MD.4 Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.

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UNIT 4: Using Tens and Ones to Organize and Count

ESSENTIAL QUESTION	BIG IDEAS
How can knowing that two-digit numbers are made of tens and ones, help us read, write, and understand the value of a number?	Students can use number patterns to help find 10 more and 10 less than a number. Students can use what they know about tens and ones in two-digit numbers to compare values.

GUIDING QUESTIONS

Content and Process

- How do you read and write numerals, and use them to represent a number of objects? **1.NBT.1**
- Using a 120 chart, how can patterns be recognized that show relationships between numbers; in particular and also notice how the counting patterns repeat after 100? **1.NBT.1**
- How can concrete objects be organized by tens and ones? **1.NBT.2a**
- How can someone recognize that in a two-digit number, the digit in the tens place represents the number of tens? **1.NBT.2c**
- What are decade numbers (e.g. 10, 20, 30, 40...) and how does place value help us define these numbers? **1.NBT.2c**
- What is the meaning of the symbols < and >? **1.NBT.3**
- How can the symbols <, >, and = be used to compare two-digit numbers? **1.NBT.3**
- What mental math strategies help to find 10 more or 10 less than a number? **1.NBT.5**

Reflective

- How can I read, write, and count from any number up to 120?
- After organizing objects, how can they be counted by 10s and then counted by 1s?
- How does understanding place value help compare numbers?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.7 Look for and make use of structure.

Standards

1.NBT.1 Count to 120 (recognizing growth and repeating patterns), starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.

1.NBT.2 Understand that the two digits of a two-digit number represent amounts of tens and ones. Understand the following as special cases:

- **1.NBT.2a** 10 can be thought of as a grouping of ten ones—called a “ten.”
- **1.NBT.2c** The numbers 10, 20, 30, 40, 50, 60, 70, 80, 90 refer to one, two, three, four, five, six, seven, eight, or nine tens (and 0 ones).

1.NBT.3 Compare two two-digit numbers based on meanings of the tens and ones digits, recording the results of comparisons with the relational symbols >, <, =, and ≠.

1.NBT.5 Given a two-digit number, mentally find 10 more or 10 less than the number, without having to count; explain the reasoning used.

1st Grade Mathematics

UNIT 5: Operations with Tens and Ones

ESSENTIAL QUESTION	BIG IDEAS
How can place value help us use numbers flexibility?	Students use models to understand addition and subtraction. Students use what they know about tens and ones to add or subtract tens from any number. Students know when adding two-digit numbers, they can add tens to tens and ones to ones.

GUIDING QUESTIONS

Content and Process

- How can the numbers 10, 20, 30, 40, 50, 60, 70, 80, and 90 be described as a number of groups of tens and 0 ones? **1.NBT.4**
- How can multiples of 10 be added to any two-digit number? **1.NBT.4**
- How can a number be decomposed into tens and ones? **1.NBT.4**
- How can addition and subtraction sentences within 100 be represented using models**? 1.NBT.4**
- What strategies can be used to solve addition and subtraction word problems? **1.NBT.4**
- When adding, how can concrete models or drawings be represented in written form? **1.NBT.4**
- How can strategies be used to add within 100? **1.NBT.4a, 1.NBT.4b, 1.NBT.4c**
- How can strategies be used to subtract multiples of 10 from decade numbers? **1.NBT.6**
- How can models be used to justify solutions to subtraction problems? **1.NBT.6**

Reflective

- How does my knowledge of place value help me add and subtract whole numbers?
- How can I explain my reasoning when adding and subtracting with multiples of 10?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.7 Look for and make use of structure

Standards

1.NBT.4 Add within 100 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 including:

- **1.NBT.4a** Adding a two-digit number and a one-digit number.
- **1.NBT.4b** Adding a two-digit number and a multiple of 10**.**
- **1.NBT.4c** Understanding that when adding two-digit numbers, combine like base-ten units such as tens and tens, ones and ones; and sometimes it is necessary to compose a ten.

1.NBT.6 Subtract multiples of 10 in the range 10 to 90 from multiples of 10 in the range 10 to 90 (positive or zero differences), 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.

1st Grade Mathematics

UNIT 6: Geometry and Measurement

ESSENTIAL QUESTION	BIG IDEAS
How do shapes help us understand our world?	Students build, draw, and describe shapes, using defining attributes. Students create new shapes by composing and decomposing two-dimensional and three-dimensional shapes. Students compose and decompose shapes to represent equal shares.
How can we measure objects in our world?	Students use appropriate tools as units to measure and compare the length of objects. Students tell and write time.

GUIDING QUESTIONS

Content and Process

- How can shapes be identified, analyzed, described, named, and compared according to attributes? **1.G.1**
- How can new shapes be built and drawn with a given set of defining attributes? **1.G.2**
- How can lines be drawn to partition circles, squares, and rectangles into two or four equal parts? **1.G.3**
- How can lengths of three objects be directly compared and ordered? **1.MD.1**
- How can the lengths of two objects be indirectly compared by using a third reference object? **1.MD.1**
- How can the length of an object be measured using a whole number of nonstandard units to measure? **1.MD.2**
- How can time be read on an analog and digital clock to the hour and half hour? **1.MD.3**
- How can the hour hand and the minute hand on an analog clock and a digital clock be drawn to shown a given time to the hour and half hour? **1.MD.3**
- How can shapes be put together and taken apart to form new shapes? **1.G.2**
- How can a shape be decomposed into equal parts (halves and fourths)? **1.G.3**

Reflective

- What strategies helped me to create new shapes using other shapes?
- What shapes are used to construct buildings in my community?
- How can I prove that I have found half or fourth of a shape?
- Why do you think measurement is important?
- Why is it helpful to be able to read the time on a clock?
- How do halves of circles relate to half hours?

FOCUS STANDARDS

Standards of Mathematical Practice

MP.7 Look for and make use of structure

Content Standards - Assessed

1.G.1 Distinguish between defining attributes *(e.g. triangles are closed and three-sided)* versus non-defining attributes *(e.g. color, orientation, overall size);* build and draw shapes that possess defining attributes.

1.G.2 Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape. Students do not need to learn formal names such as “right rectangular prism.”

1.G.3 Partition circles and rectangles into two and four equal shares, describe the shares using the words *halves*, *fourths*, and *quarters*, and use the phrases *half of*, *fourth of*, and *quarter of*. Note: fraction notation ($\frac{1}{2,}\frac{1}{4}$) is not expected at this grade level. Describe the whole as two of, or four of the shares. Understand for these examples that decomposing into more equal shares creates smaller shares.

1.MD.1. Order three objects by length; compare the lengths of two objects indirectly by using a third object.

1.MD.2 Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

1.MD.3 Tell and write time in hours and half-hours using analog and digital clocks.