2nd Grade Mathematics

UNIT 1: Numbers Within 20
Addition, Subtraction, and Data

ESSENTIAL QUESTION	BIG IDEAS
How can we use what we know about the relationship between addition and subtraction to help us solve problems including data?	Students use various strategies to solve addition and subtraction problems. Students can organize, represent and interpret data into graphs to help them answer questions about the data. Students can model a problem with pictures or diagrams to help them solve a problem.

GUIDING QUESTIONS

Content and Process

- How can fact families be used as a strategy to solve one-step problems and build number sense? **2.OA.1**
- How can someone interpret models that represent a two-step problem? **2. OA.1**
- How can someone analyze one-step addition and subtraction word problems and write equations to represent those problems? **2.OA.1**
- How can the strategies of counting on, making a ten, and doubles plus one to add two one-digit numbers help someone solving a problem? **2.OA.2**
- How can additional strategies be used to represent and solve word problems? **2.OA.2**
- What mental strategies are helpful when adding and subtracting within 20? **2.OA.2**
- How can understanding the relationship between addition and subtraction to subtract one-digit numbers within 20 be helpful? **2.OA.2**
- How can data be collected to be displayed in a bar graph or picture graph? **2.MD.11**
- How can data in a tally chart, table, picture graph, and bar graph be compared? **2.MD.11**
- How can graphs be interpreted by reading and comparing the data shown in a graph? **2.MD.11**
- How can addition and subtraction word problems be solved within 20, based on data? **2.MD.11**

Reflective

- What strategies for adding or subtracting numbers are most useful to me?
- Why would I create a data display?
- How could you create a picture graph or bar graph from a given set of data?

FOCUS STANDARDS

Standards of Mathematical Practice
MP. 4 Model with Mathematics

Standards

2.OA.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 situation equations and/or solution equations with a symbol for the unknown number to represent the problem.)*

Results Unknown:	**Change Unknown:**	**Start Unknown:**
There are 29 students on the playground. Then 18 more students showed up. How many students are there now? $29 + 18 = ?$	There are 29 students on the playground. Some more students show up. There are now 47 students. How many students came? $29 + ? = 47$	There are some students on the playground. Then 18 more students came. There are now 47 students. How many students were on the playground at the beginning? $? + 18 = 47$

2.OA.2 Fluently (efficiently, accurately, and flexibly) add and subtract within 20 using mental strategies (counting on, making a ten, decomposing a number, creating an equivalent but easier and known sum, and using the relationship between addition and subtraction) Work with equal groups of objects to gain foundations for multiplication.

2.MD.11 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.

2nd Grade Mathematics

UNIT 2: Numbers Within 100

Addition, Subtraction, Time, and Money

ESSENTIAL QUESTION	BIG IDEAS
Why is it important to be able to tell and write time, solve word problems involving money, and regroup ones as a ten?	Students use what they know about tens and ones to help them add numbers by place value. Students know how to break apart numbers to get to the nearest ten to help them solve addition and subtraction problems. Students can create models to help represent word problems. Students use skip-counting by fives to help them tell time to the nearest 5 minutes.

GUIDING QUESTIONS

Content and Process

- How can addition be used to solve a subtraction problem? **2.NBT.5**
- How is subtraction used to solve a subtraction problem? **2.NBT.5**
- How is fluently breaking apart two-digit numbers into tens and ones as a place-value strategy for addition and subtraction beneficial? **2.NBT.9**
- How can place value and properties of operations be used to justify addition and subtraction strategies? **2.NBT.9**
- How can a word problem be analyzed to determine the operation needed to solve them? **2.OA.1**
- How can fact families be used as a strategy to solve one-step problems and build number sense? **2.OA.1**
- How can time be written to 5-minute intervals using proper notation? **2.MD.7**
- How can time on an analog clock to 5-minute intervals using proper hour-hand and minute-hand placement be shown? **2.MD.7**
- How can it be determined when a digital clock should read A.M. or P.M.? **2.MD.7**
- How can addition and subtraction be used to solve problems with dollar bills, quarters, dimes, nickels, and pennies? **2.MD.8**
- How can someone count the amount of money represented by a set of coins or bills? 2.**MD.8**
- What is the value of each coin and bill? **2.MD.9**

Reflective

- What strategies or tools are most useful to me when adding and subtracting?
- What are different ways could I say time before and after the hour?
- How many ways can I find to make one dollar?
- What relationships exist between the values of a penny, nickel, dime, quarter, and dollar bill?

FOCUS STANDARDS

Standards of Mathematical Practice
MP.2 Reason abstractly and quantitatively.

Standards
2.OA.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 situation equations and/or solution equations with a symbol for the unknown number to represent the problem.)*
2.NBT.5 Fluently (efficiently, accurately, and flexibly) add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction *(e.g. composing/decomposing by like base-10 units, using friendly or benchmark numbers, using related equations, compensation, number line, etc.).*
2.NBT.9 Explain why addition and subtraction strategies work using place value and the properties of operations. The explanations given may be supported by drawings or objects
2.MD.7 Tell and write time from analog and digital clocks to the nearest five minutes.
2.MD.8 Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and ¢ symbols appropriately (Do not use decimal point, if showing 25 cents, use the word cents or ¢).
2.MD.9 Identify coins and bills and their values.

2nd Grade Mathematics

UNIT 3: Numbers Within 1,000

Place Value, Addition, and Subtraction

ESSENTIAL QUESTION	BIG IDEAS
How can exploring place value help us understand numbers?	Students can use what they know about place value to mentally add 10 or 100 to numbers or subtract 10 or 100 from numbers. Students can use a variety of strategies for adding or subtracting. Students can use what they know about place value to help them determine the total value of a number and will help them read, write, and compare numbers.

GUIDING QUESTIONS

Content and Process

- How can models be interpreted to determine the combinations of hundreds, tens, and ones in a number? **2.NBT.1**
- How can hundreds, tens, and ones be used to flexibly compose and decompose numbers? **2.NBT.1c**
- How can the value of each digit in a 3-digit number be shown using models or drawings? **2.NBT.1a, 2.NBT.1b, 2.NBT.1c**
- What patterns can be found when skip counting by 2s, 5s, and 10s? **2.NBT.2**
- How can different strategies be used to count within 1000? **2.NBT.2**
- How can someone identify the place value of each digit in a three-digit number? **2.NBT.3**
- How can you read and write numbers within 1000? **2.NBT.3**
- How can the same number be represented in a variety of ways (e.g., base-ten numerals, number names, expanded form and unit form)? **2.NBT.3**
- How can models of three-digit numbers be used to determine whether numbers are greater than, less than, or equal to each others? **2.NBT.4**
- How can three-digit numbers be compared using place value? **2.NBT.4**
- How can place value strategies and properties of operations help to flexibly add up to four two-digit numbers? **2.NBT.6**
- How can various concrete models and strategies be used to add and subtract numbers within 1000? **2.NBT.7**
- What tools and strategies can be used to mentally add or subtract 10 or 100 from a given number? **2.NBT.8**
- How can addition to be used to check the solution to a subtraction problem? **2.NBT.9**
- How can place value and properties of operations be used to justify addition and subtraction

strategies? **2.NBT.9**

Reflective

- How can I write a number in terms of varied combinations of hundreds, tens, and ones?
- How can I represent a three-digit number in multiple ways?
- What ways could you find to make it easy to see 100?
- How can I explain subtraction as a process of taking away or adding up?
- What would it look like to model a three-digit number?
- How can I subtract from three-digit numbers with zeros in the ones and/or tens place?

FOCUS STANDARDS

Standards of Mathematical Practice
MP.5 Use Appropriate Tools Strategically

Standards

2.NBT.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:

- **2.NBT.1a** 100 can be thought of as a bundle of ten tens—called a "hundred."
- **2.NBT.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
- **2.NBT.1c** Show flexibility in composing and decomposing hundreds, tens and ones *(e.g. 207 can be composed from 2 hundreds 7 ones OR 20 tens 7 ones OR 207 ones OR 1 hundred 10 tens 7 ones OR 1 hundred 9 tens 17 ones, etc.)*

2.NBT.2 Count within 1000; skip-count by 2s, 5s, 10s, and 100s; explain and generalize the patterns.

2.NBT.3 Read and write numbers within 1000 using base-ten numerals, number names, expanded form, and unit form.

2.NBT.4 Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using >, <, =, and ≠ relational symbols to record the results of comparisons.

2.NBT.6 Add up to four two-digit numbers using strategies based on place value and properties of operations.

2.NBT.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, like base-ten units such as hundreds and hundreds, tens and tens, ones and ones are used; and sometimes it is necessary to compose or decompose tens or hundreds.

2.NBT.8 Mentally add 10 or 100 to a given number 100 – 900, and mentally subtract 10 or 100 from a given number 100 – 900.

2.NBT.9 Explain why addition and subtraction strategies work using place value and the properties of operations. The explanations given may be supported by drawings or objects.

2nd Grade Mathematics

UNIT 4: Length

Measurement, Addition and Subtraction, and Line Plots

ESSENTIAL QUESTION	BIG IDEAS
Why are different tools and different units used to measure length?	Students estimate lengths of objects. Students measure objects to compare various units of lengths. Students solve word problems involving length. Students organize, represent and interpret data.

GUIDING QUESTIONS

Content and Process

- How can different standard units be used to represent, measure, and understand the lengths of objects? **2.MD.1**
- How can someone measure the length of an object in inches while measuring the length of an object in centimeters? **2.MD.1**
- How can you determine appropriate units of length (e.g., inches, feet, centimeter, meter) to measure an object? **2.MD.2**
- How can the length of a given object be estimated in inches, feet, centimeters and meters? **2.MD.3**
- How can the length of different objects be compared? **2.MD.4**
- How can measurement be used to find how much longer one object is than another? **2.MD.4**
- How can addition and subtraction be used to solve problems involving lengths? **2.MD.5**
- How can a whole number be represented as a length from 0 on a number line? **2.MD.6**
- How can a number line be used as a tool for finding the sum and difference of numbers? **2.MD.6**
- How can numbers on a ruler or number line be used to represent a given length? **2.MD.10**
- How can data be represented on a line plot? **2.MD.10**

Reflective

- How do I select the most appropriate tool to measure a given object?
- How can I use previous measurements to help you estimate the length of other objects?
- How can I recognize the importance of working within a single unit when adding or subtracting lengths?
- How can I use a number line to represent addition and subtraction?

FOCUS STANDARDS

Standards of Mathematical Practice
MP.6 Attend to precision.

Standards

2.MD.1 Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.

2.MD.2 Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.

2.MD.3 Estimate lengths using whole units of inches, feet, centimeters, and meters.

2.MD.4 Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit (inches, feet, centimeters, and meters).

2.MD.5 Use addition and subtraction within 100 to solve one- and two-step word problems involving lengths that are given in the same units*, e.g. by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.*

2.MD.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.

2.MD.10 Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object using different units. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.

2nd Grade Mathematics

UNIT 5: Shapes and Arrays

Partitioning and Tiling Shapes, Arrays, Evens and Odds

ESSENTIAL QUESTION	BIG IDEAS
How do we understand shapes and their attributes?	Students identify and draw shapes based on a given set of attributes. Students explore equality by partitioning shapes into equal shares. Students can use what they know about addition and skip-counting to find the number of objects in an array. Students explore numbers through grouping and finding patterns.

GUIDING QUESTIONS

Content and Process

- What attributes help students identify, describe, and draw cubes, quadrilaterals, triangles, pentagons, and hexagons (regular and irregular)? **2.G.1**
- How can a rectangle be partitioned into rows and columns of same-size squares? **2.G.2**
- How can an array of squares be created to fit a rectangular shape? **2.G.2**
- What does it mean to have one half, one third or one fourth of a shape? **2.G.3**
- How can a whole be described in terms of halves, thirds and fourths? **2.G.3**
- Do equal parts of a whole need to have the same shape to be equal? Why or why not? **2.G.3**
- How can the total number of objects in a group be determined as even or odd? **2.OA.3**
- How can an equation be written to show that two equal addends always make an even sum? **2.OA.3**
- How can a repeated addition equation show the total number of objects in a rectangular array? **2.OA.4**
- How does partitioning a rectangle into rows and columns of same-size squares create an array? **2.OA.4**
- How can an equation be written to express the sum of items in an array? **2. OA.4**

Reflective

- How do you know when the parts of a shape are equal or not equal?
- When would partitioning a rectangle into rows and columns be useful to me?
- Why do you think arrays are so common in our world?
- Why can I find equal groups within some numbers and not others?

FOCUS STANDARDS

Standards of Mathematical Practice

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

Content Standards- Assessed

2.G.1 Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.

2.G.2 Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.

2.G.3 Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words *halves*, *thirds*, *half of*, *a third of*, etc., and describe the whole as two halves, three thirds, four fourths. *Note: fraction notation* $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$ *is not expected at this grade level.* Recognize that equal shares of identical wholes need not have the same shape.

2.OA.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.

2.OA.4 Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.