Milford Public Schools Curriculum

Department: Mathematics
Course Name: Mathematics Grade 2

UNIT 1

Unit Title: Addition, Subtraction and the Number System – How many of each?
Unit Description: In this unit, students refine their understanding of the base ten number system and use place value concepts of ones, tens, and hundreds to understand number relationships. They become fluent in writing and renaming numbers in a variety of ways. This fluency, combined with the understanding of place value, is a strong foundation for learning how to add and subtract two-digit numbers.

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
Addition is used to represent when things are coming together and subtraction is used to represent when things are being taken away or compared. The number line has the whole numbers equally spaced and can be used to find sums (counting on) and differences (distance between). Coins all have different values and can build understanding for skip counting and regrouping.	How can we represent situations where things are coming together or being taken away? How can the number line be a helpful tool? How are coins related to math?

Content and Skills:
Create equivalent expressions
Represent numbers on the number line
Solve one step story problems with addition or subtraction of two, two-digit numbers using strategies (place value, properties of operations, counting all, counting on, decomposing numbers, counting back, counting up, taking away a number in chunks) and models (number lines, cubes, pictures, and fingers)
Double numbers using arrays and addition
Identify a penny and know it is worth 1¢
Identify a nickel and know it is worth 5¢
Identify a dime and know it is worth 10¢
Identify a quarter and know it is worth 25¢
Count up to 120 objects
Find combinations that make 10
Locate numbers on the hundreds chart

Standards Addressed:
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.NBT.2-Count within 1000; skip-count by 5s, 10s, and 100s.
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 equations with a symbol for the unknown number to represent the problem.
2.OA.2-Fluently add and subtract within 20 using mental strategies. 2 By end of Grade 2, know from memory all sums of two one-digit numbers.

UNIT 2

Unit Title: 2D and 3D Geometry – Shapes, Blocks and Symmetry
Unit Description: In this unit, students extend their spatial understanding of geometry developed in kindergarten and grade one by solving problems involving two-and three-dimensional geometric figures. Students describe, identify, sort, and name two-dimensional and three-dimensional shapes. They combine shapes to make new shapes.

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
A shape is defined by its attributes. Same-size squares can be used to find the area of two-dimensional shapes. Two-dimensional shapes are flat while three-dimensional shapes take up space (are solid).	How are shapes named and described? How are 2D shapes measured? How are two-dimensional and three-dimensional shapes different?

Content and Skills:
Given all of the faces of a shape, identify which 3D shape they will make
Create arrays for doubles
Name 2D shapes based on their attributes (number of sides): triangle, quadrilateral, hexagon, pentagon
Sort shapes by a given attribute
Identify the vertices of a shape
Compare angles to a right angle
Order rectangles by comparing areas
Cover a rectangle with same-size squares to find the area
Create rectangles with the same area but different side lengths

Standards Addressed:
2.G.1-Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 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.NBT.2-Count within 1000; skip-count by 5s, 10s, and 100s.
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 equations with a symbol for the unknown number to represent the problem.
2.OA.2-Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
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.

UNIT 3

Unit Title: Addition, Subtraction and the Number System – Sticker, Number Strings and Story Problems
Unit Description: In this unit, students focus on what it means to add and subtract as they become fluent with single-digit addition and subtraction facts and develop addition and subtraction procedures for two-digit numbers. Students make sense of these procedures by building on what they know about place value and by putting together and taking apart sets of objects. Strategies are developed to solve addition and subtraction problems with totals up to 45.

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
The placement of a digit in a number determines its value. Addition and subtraction are inverse operations. Subtraction problems can be written as addition problems with a missing addend. All even numbers can be written as a sum of two equal addends.	How is the placement of the digits in a number important? How are addition and subtraction problems related?

Content and Skills:
Use strategies such as making 10, doubles, near doubles, and familiar combinations to solve problems with 3 addends.
Use calculators to solve addition problems.
Use strategies such as count all, count on, add 10's and add 1's, and the number line to solve addition story problems.
Use strategies such as take away and recount, count back, count back by groups, break the minuend apart, and the number line to solve subtraction story problems.
Use horizontal and vertical notation to represent addition and subtraction.
Solve problems with a missing addend.
Determine if a group of objects is even or odd.
Skip count by 2's, 5's, and 10's.
Represent a number using tally marks.
Identify and use coin equivalency.
Identify which digit is in the tens place and which digit is in the ones place in a two-digit number.
Decompose a two-digit number into groups of tens and groups of ones.
Compare numbers to 20.

Standards Addressed:
2.NBT.2-Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
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 equations with a symbol for the unknown number to represent the problem.
2.OA.2-Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.

UNIT 4

Unit Title: Data Analysis
Unit Description: In this unit, students will be posing questions, collecting and sorting information, and making representations of data as a way of sharing their findings with others.

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
Picture graphs and bar graphs can be used to represent data. Information about a population or set of objects can be learned from data.	How can data be represented? What can be learned using data?

Content and Skills:
Group data into categories based on similar attributes.
Write an equation to show that the sum of the categories equals the total responses.
Verbally explain which group is larger (ex. “more kids are wearing stripes than not wearing stripes.”)
Order numbers using manipulatives.
Plot data on a line plot.
Combine multiple addends.
Create a plan to collect and organize data.
Describe what the data shows about the group surveyed.
Make a prediction about a population then collect data and record it to analyze prediction.
Use a data set to make a hypothesis.
Compare 2 sets of data.
Use a Venn diagram to organize data.
Represent data using a bar graph.
Develop fluency with subtraction facts related to near double combinations.

Standards Addressed:
2.G.1-Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2.MD.7-Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
2.MD.8-Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and Â¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?
2.MD.10-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 problems1 using information presented in a bar graph.
2.NBT.2-Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.OA.2-Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.

UNIT 5

Unit Title: Patterns, Functions and Change
Unit Description: In this unit, students describe and represent ratios, use tables to represent and predict change, and work with numeric sequences as they construct, describe and extend patterns.

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
In a pattern that increases by a constant number, any output (total number of cubes in a tower of a given height) can be found efficiently by skip counting or repeated addition.	How can constantly increasing patterns be extended?

Content and Skills:
Use manipulatives to show a relationship where we are adding the same amount repeatedly.
Represent the relationship between two quantities using a table.
Find and extend a pattern where one quantity is increasing by the same amount each time.
Use repeated addition to find missing entries on a table.
Describe the relationship between two quantities that represent a constant ratio.
Identify the unit of a repeating pattern.
Extend a pattern using the repeating unit.
Identify a number as being either even or odd.
Label each element in a pattern using a counting number and identify (by number) which elements will have a particular attribute (color).

Standards Addressed:
2.G.1-Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces.1 Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.
2.MD.7-Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
2.MD.8-Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and Â¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?
2.MD.10-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 problems1 using information presented in a bar graph.
2.NBT.2-Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.3-Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.NBT.6-Add up to four two-digit numbers using strategies based on place value and properties of operations.
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 equations with a symbol for the unknown number to represent the problem.
2.OA.2-Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.
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.

UNIT 6

Unit Title: Addition, Subtraction and the Number System
Unit Description: This unit develops ideas the base ten number system and place value concepts covered in Unit 3. Students learn to group three-digit numbers into hundreds, tens and ones in more than one way. They learn to write an equation that represents a problem**.**

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
The location of a digit determines its value. Numbers can be decomposed, to make combining them easier. Subtraction can be represented as the distance between two numbers on a number line or how many more are needed to get to a number.	Why is the placement of a digit important? What are some strategies to combine quantities more efficiently? How can we represent subtraction problems?

Content and Skills:
Add two digit numbers using efficient strategies (number line, place value, adding multiples of 5 and 10, keeping one number whole, hundreds chart).
Add tens to tens and ones to ones to combine two digit numbers.
Write equations to represent a story problem.
Use a number line to represent how an addition problem was solved.
Record strategies (show work) to add and subtract using place value.
Decompose and compose numbers using place value.
Find the difference between a number and a multiple of 10 (up to 100).
Use a place value model to represent a number as tens (strips) and ones (singles).
Add coin amounts (up to $1.00).
Use coins to count by 5s and 10s.
Determine the difference between a given amount and a dollar.
Skip counting by 2s, 5, and 10s.
Compare numbers using <, > (above 200).
Add or subtract either 10 or 100 from a number.
Read and write numbers greater than 200.
Compare three digit numbers using place value models.
Represent two- and three-digit numbers using expanded form.

Standards Addressed:
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.7-Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
2.MD.8-Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using $ and Â¢ symbols appropriately. Example: If you have 2 dimes and 3 pennies, how many cents do you have?
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations,

and/or the relationship between addition and subtraction.
2.NBT.9-Explain why addition and subtraction strategies work, using place value and the properties of operations.
2.OA.2-Fluently add and subtract within 20 using mental strategies.2 By end of Grade 2, know from memory all sums of two one-digit numbers.

UNIT 7

Unit Title: Fractions - Parts of a Whole, Parts of a Group
Unit Description: This unit develops ideas about understanding, representing, and computing with fractions. Students learn what one-half and one-fourth mean. Students work on story problems that involve dividing both single objects and sets in halves, fourths, and thirds. They learn the halves in sets, which objects can be divided into two equal parts.

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
When one whole is broken into equally sized parts, we can use fractions to describe the parts.	How can we describe amounts that are less than one whole?

Content and Skills:
Determine if a block is half of another block.
Finding equal parts of a whole and naming them with a fraction.
Partition rectangles and circles into two, three, or four equal shares.
Describe fractional parts using halves, thirds, and fourths.

Standards Addressed:
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. Recognize that equal shares of identical wholes need not have the same shape.
2.MD.7-Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
2.NBT.2-Count within 1000; skip-count by 5s, 10s, and 100s.
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.

UNIT 8

Unit Title: Addition, Subtraction, and the Number System - Partners, Teams, and Paper Clips

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
We can use reasoning about the number system and known facts to prove a conjecture will be true for all numbers. In the base ten system, once we have a group of 10 it is represented in the next highest place value position	How can we prove a conjecture will always be true? How do we use our number system to write larger numbers? How and when do we decompose numbers to subtract?

(10 groups of 10 is represented as 100.) When subtracting ones from ones, tens from tens, etc., if we have a digit where we cannot subtract then we need to decompose the number in the next highest place value.	

Content and Skills:
Determine if a group has an even or odd number of objects by pairing or grouping objects.
Fluently add and subtract within 20 using strategies (doubles, near doubles, make a 10, etc.)
Use notation (+, -, =) to represent addition and subtraction problems.
Subtract amounts from 100 using the number line and hundreds chart.
Subtract using place value and represent it with an equation.
Subtract by adding up, counting backwards, or subtracting in parts.
Add two 2-digit numbers with a sum greater than 100.
Represent a 3-digit number using a place value model.
Add two 3-digit numbers by combining hundreds, tens, and ones.
Use place value models to subtract (2- and 3-digit numbers).
Subtract with regrouping using the place value model.

Standards Addressed:
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.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.7-Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m.
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.
2.NBT.9-Explain why addition and subtraction strategies work, using place value and the properties of operations.

UNIT 9

Unit Title: Measurement: Measuring Length and Time
Unit Description: This unit develops ideas about understanding of the concept of length and how length is measured. As students compare lengths of real-world objects, they come to recognize length in many different contexts. They start to measure objects that have two dimensions that can be measured (the length and width of a desk top). In this unit, students also learn about the duration of time and the relative size of time (minutes, hours, days, weeks, months and years).

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
Objects are measured by iterating the same length unit across the object. Objects need to be measured with the same units in order to be compared.	How do we measure length? How do we compare the length of two objects?

Content and Skills:
Measure an object using non-standard units.
Subtract two 2-digit numbers using strategies.
Create and use a 12-inch measuring tool.
Estimate lengths using inches, feet, centimeters, and meters.
Measure in feet, inches, and yards.
Measure in centimeters and meters.
Select appropriate tools to measure.
Tell time to the nearest quarter-hour.
Find the difference in length between two objects.
Show multiple measurements by making a line plot.
Tell and write time from analog and digital clocks to the nearest 5 minutes (Investigation goes to quarter hour) using am and pm.

Standards Addressed:
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.4-Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.
2.NBT.5-Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.