Milford Public Schools Curriculum

Department: Mathematics
Course Name: Mathematics Grade 3

UNIT 1

Unit Title: Addition, Subtraction and the Number System - Trading Stickers, Combining Coins
Unit Description: Students solve addition problems with two and small three-digit numbers, solve subtraction problems involving two-digit numbers, find combinations of numbers that add to 100, and work with coins and coin values. Their understanding of place value develops as they add and subtract 10s to and from three-digit numbers, break three-digit numbers into hundreds, tens, and ones in different ways, and solve story problems involving hundreds, tens, and ones.

LEARNING GOALS

Enduring Understanding(s):
Addition can be used to solve real world problems that involve joining, separating, part-part whole or comparison.
There are properties that are used to govern arithmetic and algebra that are always true. Relationships can be described and generalizations made for mathematical situations that have numbers or objects that repeat in predictable ways.

Essential Question(s):
How can addition properties be used to show relationships that always hold true?
How can you use patterns on a hundreds chart to add two digit numbers?
How can you break apart numbers to help you add 2 digit numbers using mental math?
Why is understanding place value important?

Content and Skills:
The base-ten numbers system-understanding the equivalence of one group and the units that comprise it
Computational fluency-adding and subtracting accurately and efficiently

Standards Addressed:
3.NBT.2 Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.OA.8 Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.
3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. *For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.*

UNIT 2

Unit Title: Addition and Subtraction- Collections and Travel Stories

Unit Description: Students practice and refine their strategies for solving addition problems with three-digit numbers to 400 and subtraction problems with two- and three-digit numbers to 300. In addition to solving removal problems, they expand their understanding of subtraction as they solve comparison problems and problems in which they find the missing part of a whole. They increase their understanding of place-value as they extend their work into three-digit numbers up to 1,000 and study the structure of 1,000.

LEARNING GOALS

Enduring Understanding(s):
Estimation is a way to show the reasonableness of an answer.
Addition means putting together.
Subtraction means taking away (removal), finding a missing part (missing addend), and/or the difference between (comparing).
Working with elapsed time is regrouping minutes at 60 instead of 100.

Essential Question(s):
How do I know if my answer is reasonable?
How do I know when to add and when to subtract in a problem?
How is elapsed time related to addition and subtraction?

Content and Skills:
Read, write and sequence numbers to 1000
Use place value to determine what two multiples of 10 or 100 a number is between.
Use landmark numbers to locate other numbers on a number line, hundreds grid, and thousands chart.
Estimate the sums of 2- and 3-digit numbers.
Find pairs of numbers that add to 100.
Tell how many tens are in a 3-digit number.
Find the difference between two 3-digit numbers using subtraction on a number line and/or a 1000 chart.
Round to the nearest 10 or 100.

Standards Addressed:
3.NBT.1-Use place value understanding to round whole numbers to the nearest 10 or 100.
3.NBT.2-Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.OA.8-Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

UNIT 3

Unit Title: Multiplication and Division – Equal Groups

Unit Description: In this unit, students develop an understanding of multiplication as combining a number of equal groups and division as splitting a quantity into equal groups. This understanding is developed as students highlight multiples on 100 charts, describe patterns in sets of multiples, and compare sets of multiples to each other. Students represent multiplication and division situations with groups, rectangular arrays, and by writing multiplication and division story problems. In this unit, students achieve fluency with multiplication combinations with products to 50 and consider the relationship between multiplication and division (e.g., 6 x 4 = 24; 24 ÷ 6 = 4).

LEARNING GOALS

Enduring Understanding(s):
Multiplication finds the total number of objects when there is an equal number of objects in each group.
Multiplication is repeated addition.
Division breaks things into equal groups.
Multiplication and division are inverse operations.
Division situations can be written as unknown-factor problems.

Essential Question(s):
How can we represent situations with equal groups?
How is multiplication related to addition?
How can we represent situations where we are sharing equally?
How are multiplication and division related?

Content and Skills:
Skip count accurately.
Find products using repeated addition/skip counting.
Use multiplication and division notation.
Identify multiples of 2, 3, 4, 5, 6 and 10 by skip counting.
Use doubles and halves of known products to find related products.
Represent a multiplication problem using arrays, equal groups, and number lines.
Identify prime numbers and square numbers.
Manipulate problems using number flexibility to create a solvable problem (e.g. think of 9 X 4 as 10 X 4 – 4).
Multiply by multiples of 10.

Standards Addressed:
3.MD.7-Relate area to the operations of multiplication and addition.
3.NBT.3-Multiply one-digit whole numbers by multiples of 10 in the range 10â€'90 (e.g., 9 Ã— 80, 5 Ã— 60) using strategies based on place value and properties of operations.
3.OA.1-Interpret products of whole numbers, e.g., interpret 5 Ã— 7 as the total number of objects in 5 groups of 7 objects each.
3.OA.2-Interpret whole-number quotients of whole numbers, e.g., interpret 56 Ã· 8 as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each.
3.OA.3-Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
3.OA.4-Determine the unknown whole number in a multiplication or division equation relating three whole numbers.
3.OA.5-Apply properties of operations as strategies to multiply and divide.
3.OA.6-Understand division as an unknown-factor problem.

UNIT 4

Unit Title: Geometry – Perimeter, Angles and Area

Unit Description: This unit develops ideas about the attributes of 2-D objects and how they are classified (the definition of a triangle, rectangle, and square), linear measurement (which includes perimeter), area, and the measurement of angles. Using the context of perimeter, students continue to develop their ability to use measurement tools as they work on accurate linear measurement techniques. Students learn to identify angles by their relationship to a right angle. (Is the angle greater than, less than, or equal to a 90-degree angle?) They develop an understanding of area as the amount of flat space an object covers and determine the area of 2-D shapes in square units.

LEARNING GOALS

Enduring Understanding(s):
Attributes (number of vertices, perimeter, area, etc.) are used to describe objects.
Perimeter is a linear measurement and is useful when surrounding an object (framing a picture) while area measurements are useful when covering an object (painting a wall).

Essential Question(s):
How can objects be described?
How are area and perimeter different and when is each more useful?

Content and Skills:
Measure accurately with standard and metric units.
Estimate measurements.
Find the perimeter of a figure by measuring the side lengths.
Find an unknown side length of a figure when given the other side lengths and the perimeter.
Draw and label a straight line that represents the perimeter of a figure.
Identify congruent figures.
Measure area by tiling leaving no gaps or overlaps.
Identify different shapes with the same area.
Estimate the area and perimeter of irregular figures.
Create rectangles with the same area and different perimeters.
Create rectangles with the same perimeter and different areas.
Identify right angles.
Classify angles as less than, greater than, or equal to a right angle.
Choose appropriate units to measure.

Standards Addressed:
3.MD.5-Recognize area as an attribute of plane figures and understand concepts of area measurement.
3.MD.6-Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).
3.MD.8-Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

UNIT 5

Unit Title: Fractions – Finding Fair Shares

Unit Description: Students develop an understanding of the unit fraction (1/b) and how other fractions are built from that unit fraction. An example would be that is made by adding the unit fraction three times (1/4 +1/4 +1/4). Students use their knowledge of whole numbers on a number line to develop their understanding of fractions on a linear model, such as a number line. They learn to identify the intervals on the number line based on the unit fraction. Students identify equivalent fractions as well as fractions that are equivalent to whole numbers by reasoning about their size.

LEARNING GOALS

Enduring Understanding(s):
Fractions represent part of a whole.
Fractions are composed of one (unit fraction) or more equal parts which the whole is divided into. The numerator tells us how many parts we have and the denominator tells us how many parts make one whole. Equivalent fractions of the same whole have the same area, and they are located at the same place on the number line.

Essential Question(s):
How do we represent amounts that are less than one whole?
What does the numerator and denominator tell us about a fraction?
How do we know if two fractions are equivalent?

Content and Skills:
Name equal parts of one whole with a fraction.
Divide an area into equal parts.
Order unit fractions from largest to smallest.
Create area models for fractions.
Create set models for fractions.
Represent fractions on a number line.
Compare fractions using number lines and area models.
Use inequality notation $(<, >)$ with fractions.
Write equivalent fractions.
Find fractions that sum to one.
Combine fractions using models.
Create a situation to represent a given fraction (use pattern blocks to make a design that is half yellow).

Standards Addressed:
3.NF.1-Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.
3.NF.2-Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3.NF.3-Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.
3.NF.2a-Represent a fraction 1/b on a number line diagram by defining the interval from 0 to 1 as the whole and partitioning it into b equal parts. Recognize that each part has size 1/b and that the endpoint of the part based at 0 locates the number 1/b on the number line.
3.NF.2b-Represent a fraction a/b on a number line diagram by marking off a lengths 1/b from 0. Recognize that the resulting interval has size a/b and that its endpoint locates the number a/b on the number line.
3.NF.3a-Understand two fractions as equivalent (equal) if they are the same size, or the same point on a number line.
3.NF.3b-Recognize and generate simple equivalent fractions, e.g., 1/2 = 2/4, 4/6 = 2/3). Explain why the

fractions are equivalent, e.g., by using a visual fraction model.

3.NF.3c-Express whole numbers as fractions, and recognize fractions that are equivalent to whole numbers. Examples: Express 3 in the form 3 = 3/1; recognize that 6/1 = 6; locate 4/4 and 1 at the same point of a number line diagram.

3.NF.3d-Compare two fractions with the same numerator or the same denominator by reasoning about their size. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with the symbols >, =, or <

UNIT 6

Unit Title: How Many Hundreds? How Many Miles?

Unit Description: Students further refine their addition strategies with problems involving any three-digit numbers as they identify and name these strategies. They continue to solve a variety of subtraction problems and examine their strategies for subtracting any two- and three-digit numbers in greater depth. Students extend their work with place value by estimating the sum of three-digit numbers (Will the sum be more or less than 400?) and adding and subtracting multiples of 10 and 100 to and from three-digit numbers.

LEARNING GOALS

Enduring Understanding(s):
When we change an expression to make it easier to simplify, we must adjust the answer to maintain equality with the original problem.
The equal sign shows that the expression on either side represent the same quantity.
The standard unit for liquid volume is liters
The standard units for mass are kilograms and grams

Essential Question(s):
How can we use what we know to solve harder problems?
What does the equal sign mean?
What are the standard units for liquid volume and mass?

Content and Skills:
Estimate sums and differences of 3-digit numbers using number flexibility, the number line, multiples of 10 and 100, etc.
Subtract from multiples of 100.
Compose and decompose numbers to add and subtract.
Combine hundreds to numbers over 100.
Use number lines, hundreds grids, and thousands charts to subtract 3-digit numbers.
Use a known subtraction problem to solve a related problem (for example 200-75=125, then 200-78=122 because we are taking 3 more away so the difference is 3 smaller).
Add and subtract multiples of 10 and 100.
Fluently multiply and divide within 100.
Solve addition problems with more than 2 addends.
Create equivalent addition expressions.
Explain why 2 expressions are equivalent using context (story situation)
Change the numbers in an addition problem to create an equivalent but simpler problem.
Solve multi-step addition and subtraction problems.
Subtract 3-digit numbers by adding on or counting back.
Change one or more addends a landmark number and find the sum then change the sum to compensate for the changes.
Liquid volume is the amount of space a liquid takes up
1,000 milliliters is 1 liter
1,000 grams is 1 kilogram

Standards Addressed:
3.NBT.1-Use place value understanding to round whole numbers to the nearest 10 or 100.
3.NBT.2-Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 Ã— 5 = 40, one knows 40 Ã· 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.
3.OA.8-Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding
3.NF.2-Understand a fraction as a number on the number line; represent fractions on a number line diagram.
3.MD.2-Measure and estimate liquid volumes and masses of objects using standard units of grams (g), kilograms (kg), and liters (l).1 Add, subtract, multiply, or divide to solve one-step word problems involving masses or volumes that are given in the same units, e.g., by using drawings (such as a beaker with a measurement scale) to represent the problem.

UNIT 7

Unit Title: Multiplication –Factors, Multiples and Arrays
Unit Description: Students deepen their understanding of the operation of multiplication. Students use rectangular arrays to represent the relationship between factors and multiples, use what they know to solve problems that increase in size, and focus on solving problems efficiently. They continue to develop fluency with multiplication combinations (facts up to 12 x 12).

LEARNING GOALS

Enduring Understanding(s):	**Essential Question(s):**
What are different models of and models for multiplication and division? What are efficient methods for finding products and quotients?	How does an array help me solve multiplication problems? How do I use multiplication facts I know to help me solve facts I'm working on? How do I find the factors of a multiple? How do I find the multiples of a number? How can information be gathered, recorded and organized? What helps me understand and interpret data?

Content and Skills:
Identify and learn multiplication facts not yet known fluently.
Find factors and multiples for a given number.
Find all of the factor pairs for a given number (1-100).
Understand and work with an area model of multiplication.
Use known multiplication combinations to determine the products of more difficult combinations.

Standards Addressed:
3.NBT.1-Use place value understanding to round whole numbers to the nearest 10 or 100.
3.NBT.2-Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.NBT.3-Multiply one-digit whole numbers by multiples of 10 in the range 10â€'90 (e.g., 9 Ã— 80, 5 Ã— 60) using strategies based on place value and properties of operations.

3.OA.1-Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each.

3.OA.5-Apply properties of operations as strategies to multiply and divide.

3.OA.7-Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

3.OA.8-Solve two-step word problems using the four operations. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

UNIT 8

Unit Title: Data Analysis -Surveys and Line Plots

Unit Description: Students collect, represent, describe, categorize, and interpret both categorical and numerical data. They begin the important work of seeing a data set as a whole as they design and carry out their own data investigations, create representations of the data collected, and compare and discuss these representations. Students draw conclusions about the data by identifying characteristics in their representations. (Where is most of the data clumped? Where is the mode?)

Students' collection of numerical data includes measuring length in inches and feet. Students review the basic units of inches, feet, and yards and their relationships (e.g., one foot is equivalent to 12 inches, one yard is equivalent to 3 feet or 36 inches) by measuring lengths longer than one foot.

LEARNING GOALS

Enduring Understanding(s):
Graphs represent data and can be used to compare data.
Different types of graphs highlight different aspects of a data set.

Essential Question(s):
What kind of information can be shared in a graph?
Which type of graph would best represent a specific data set?

Content and Skills:
Classify data into categories.
Pose questions from data.
Answer questions posed from data.
Create/revise survey questions.
Create a pictograph, bar graph, and line graph.
Interpret/describe data from a graph.
Read and understand the scale/key.
Use data to compare while using purposeful phrases.
Use a key on a pictograph to interpret the symbols.
Use a ruler to measure to the nearest ¼ inch.

Standards Addressed:
3.MD.3-Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.

3.MD.4-Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Show the data by making a line plot, where the horizontal scale is marked off in appropriate "units" whole numbers, halves, or quarters.