



Mathematics Benchmarks K-5

GRADE K

MATHEMATICS

Math and its application are constantly being developed. To that end we offer a program that emphasizes problem solving and mathematical relationships. The program incorporates a variety of manipulative materials and strategies to teach and reinforce mathematical concepts. The following represents the objectives introduced during kindergarten.

Ongoing activities: Calendar, Graphing, Estimation, and Probability

- Use calendars daily to explore time concepts (days of the week, months of the year).
- Collect, organize, describe and display information.
- Use real materials to display information.
- Construct and interpret real graphs, pictographs and bar graphs.
- Explore ways of recording, organizing and analyzing data.
- Develop and begin to use estimation strategies and skills
- Estimate and verify the number of objects (maximum 10).
- Use estimation strategies to express & dictate the reasonableness of an answer.
- Estimate sets of objects in terms of more than, less than, or same without counting.
- Use concept of chance to make and verify predictions.
- Record and discuss results from simple probability activities and engage in chance activities using materials such as number cubes and spinners.
- Make and test predictions.
- Discuss the likelihood that various events will occur.
- Use concept of cause and effect to make and verify predictions about what will occur.
- Introduce and discuss real life experiences using simple proportions with concrete materials (e.g., if there are 40 cookies and 20 students how many cookies may each student have?)
- Recognize simple patterns in a variety of contexts including songs, nursery rhymes and everyday life.
- Explore numerical patterns.
- Using a hundreds chart.
- Identify and use ordinal numbers first through fifth.
- Engage in systematic listening, counting and reasoning.
- Follow and describe simple procedures and directions.
- Explore a variety of mathematical ideas through puzzles games and counting problems.
- Develop and begin to use mental math strategies and skills.
- Dictate a story problem.
- Use appropriate technology to enhance the understanding of mathematical concepts.

Math Readiness Skills

- Use positional language, such as under, over, in front of, next to, near, to describe position and order.
- Describe position of objects using terms such as first, last, in front of, behind.
- Count and identify and provide a pictorial representation of numbers 1-20.
- Identify and name colors.
- Identify and name shapes.
- Use appropriate technology to enhance the understanding of numbers and mathematics.

Sorting and Graphing

- Compare, sort and classify objects based on a common attribute.
- Group items by attributes and verbalizes the reason.
- Classify objects and events based on self-selected criteria.
- Use appropriate technology to enhance the understanding of sorting and classifying.

Patterns

- Recognize simple patterns in a variety of contexts including songs, nursery rhymes and everyday life.
- Identify rules and extend patterns based on the rules.
- Create simple patterns using a variety of materials.
- Reproduce, create and describe patterns and sequences using attributes, numbers and geometric shapes.
- Identify, create and dictate patterns in a variety of contexts such as poetry, art, music, body movement, shape and color.
- Use appropriate technology to enhance the understanding of patterns.

Number Sense

- Construct a set of objects.
- Demonstrate understanding of one-to one correspondence when counting objects.
- Use correct mathematical vocabulary to describe quantitative relationships (such as: same as, more than, less than).
- Use concrete objects to demonstrate the concepts of one more and one less.
- Separate a set in half.
- Write, recognize and form numbers 0-5.
- Use numbers to label (0-5).
- Relate the number word to the numerals 0-5.
- Order and compare whole numbers to 0-5.

Shapes & Geometry

- Identify, discuss and describe the properties of plane and solid shapes using concrete and pictorial models.
- Classify the properties of plane and solid shapes using concrete and pictorial models.
- Use terms such as straight, curved and flat to describe two- and three- dimensional shapes.
- Model the properties of plane and solid shapes using concrete and pictorial models.
- Use a variety of materials to construct various shapes and explore their attributes.
- Draw and/or reproduce common two-dimensional geometric shapes.
- Explore and discuss spatial relationships using activities that involve direction, orientation, combining, dividing, and transforming shapes with concrete and pictorial models.
- Construct and discuss designs and patterns using geometric shapes.
- Create designs and work puzzles to develop the concepts of symmetry and of various transformations (reflections, rotations and translations)
- Identify common geometric shapes found in the world around them (art, nature, the classroom or at home).
- Identify whole and half.
- Separate a shape in half.

- Use appropriate technology to enhance the understanding of shapes and geometry.

Number Sense

- Write, recognize and form numbers 10-30.
- Use numbers to label (10-30).
- Order and compare whole numbers to 0-30.
- Use appropriate technology to enhance the understanding of numbers.

Money

- Recognize penny, nickel, dime and quarter.
- Recognize value of penny, nickel, dime and quarter.
- Compare value of coins.
- Use appropriate technology to enhance the understanding of money.

Measurement

- Order 3 to 5 objects on the basis of one attribute such as length.
- Use numbers to measure.
- Use common instruments such as measuring cups and simple balance scales to measure approximate capacity and weight.
- Use nonstandard units and tools for estimating and verifying measures of length, area, weight and volume.
- Visually estimate length, area and volume using various units.
- Compare and contrast size, weight or temperature of objects using terms such as more than, less than, bigger, smaller, hotter, and colder.

Time

- Sequence time events.
- Use calendars to explore time concepts.
- Sequence events in stories and time periods.
- Describe qualitative change over time, such as growing taller, hotter and colder.
- Identify and use ordinal numbers first through fifth.
- Tell time to the hour on analog and digital clocks.
- Use appropriate technology to enhance the understanding of time.

Addition & Subtraction

- Discover and use the commutative property of addition.
- Use concrete, pictorial, and symbolic models to demonstrate understanding of addition and subtraction.
- Identify that the equal sign indicates or represents a relationship of equivalent quantities.
- Develop & verbalize meaning of addition.
- Model real-world problems and dictate using number sentences to describe situations.
- Use appropriate technology to enhance the understanding of addition and subtraction.

GRADE 1

MATHEMATICS

Math and its application are constantly being developed. To that end we offer a program that emphasizes problem solving and mathematical relationships. The program incorporates a variety of manipulative materials and strategies to teach and reinforce mathematical concepts. The following represents the objectives introduced during kindergarten.

Ongoing activities: Calendar, Graphing, Estimation, and Probability

- Use calendars daily to explore time concepts (days of the week, months of the year).
- Collect, organize, describe and display information.
- Use tallies.
- Use real materials to display information.
- Construct, interpret and write about real graphs, pictographs and bar graphs.
- Explore ways of recording, organizing and analyzing data.
- Develop, use and write about estimation strategies and skills.
- Estimate and verify the number of objects (maximum 20).
- Use estimation strategies to express & dictate the reasonableness of an answer.
- Estimate sets of objects in terms of more than, less than, or same without counting.
- Use concept of chance to make and verify predictions.
- Record, discuss and write about results from simple probability activities and engage in chance activities using materials such as number cubes and spinners.
- Make and test predictions.
- Discuss the likelihood that various events will occur.
- Use concept of cause and effect to make and verify predictions about what will occur.
- Discuss and write about real life experiences using simple proportions with concrete materials (e.g., if there are 40 cookies and 20 students how many cookies may each student have?)
- Recognize simple patterns in a variety of contexts including songs, nursery rhymes and everyday life.
- Explore & identify numerical patterns.
- Identify and use ordinal numbers first through fifth.
- Engage in systematic listening, counting and reasoning.
- Follow and describe simple procedures and directions.
- Explore a variety of mathematical ideas through puzzles games and counting problems.
- Develop and begin to use mental math strategies and skills.
- Write a story problem.
- Use appropriate technology to enhance the understanding of mathematical concepts.

Readiness

- Demonstrate understanding of one-to one correspondence when counting objects.
- Construct a set of objects.
- Use correct mathematical vocabulary to describe quantitative relationships (such as: same as, more than, less than).
- Count and identify, write and provide a pictorial representation and write numbers 1-100.
- Relate the number word to the numerals 1-20.

- Use numbers to label.
- Follow and describe simple procedures and directions.
- Use concrete objects to demonstrate the concepts of one more and one less.
- Sort and classify objects based on a common attribute.
- Classify objects and events based on self-selected criteria.
- Group items by a single attribute and verbalizes the reason.
- Explore and write about a variety of mathematical ideas through puzzles games and counting problems.
- Engage in systematic listening, counting and reasoning.
- Use appropriate technology (calculator or computer) to enhance development of number sense.

Patterns

- Use a variety of materials to reproduce, create, and describe patterns and sequences using attributes, numbers and geometric shapes.
- Create simple patterns using a variety and materials.
- Identify and explain rules and extend patterns based on the rules.
- Identify, create and write about patterns in a variety of contexts such as poetry, art, music, body movement, shape and color.
- Use appropriate technology to enhance and extend understanding of patterns.

Addition & Subtraction Concepts

- Identify that the equal sign represents a relationship of equivalent quantities.
- Develop, verbalize and extend the meaning of addition.
- Use concrete, pictorial and symbolic models to demonstrate understanding of addition.
- Use the commutative property of addition
- Develop & verbalize, and extend meaning of subtraction.
- Use concrete, pictorial and symbolic models to demonstrate the understanding of subtraction.
- Dictate a story problem using addition and subtraction.
- Model real-world problems and write about using number sentences to describe situations
- Use appropriate technology to enhance the understanding of addition and subtraction

Addition & Subtraction Facts to 10

- Develop, verbalize and extend the meaning of addition.
- Use concrete, pictorial and symbolic models to demonstrate understanding of addition.
- Use the commutative property of addition
- Develop & verbalize, and extend meaning of subtraction.
- Use concrete, pictorial and symbolic models to demonstrate the understanding of subtraction
- Dictate a story problem that uses addition and /or subtraction.
- Model real-world problems and write about them using number sentences to describe situations.
- Develop and begin to use mental math strategies and skills.
- Demonstrate fluency with basic facts to 12.

- Use appropriate technology to enhance the understanding of addition and subtraction.

Addition & Subtraction to 12 and Numbers to 100

- Count and identify, write and provide a pictorial representation and write numbers 1-100.
- Use correct mathematical vocabulary to describe quantitative relationships (such as: same as, more than, less than, before, after, middle, 1 less, 1 more, 10 less, 10 more).
- Relate the number word to the numerals 1-20.
- Order and compare whole numbers 1 to 100.
- Count by 2's, 5's and 10's to complete number patterns on a 100's chart.
- Use estimation strategies to determine reasonableness of an answer.
- Dictate a story problem.
- Model real-world problems and write about using number sentences to describe situations.
- Demonstrate fluency with basic facts to 12.
- Use appropriate technology to enhance the understanding of addition and subtraction.

Money, Time & Graphing

- Sort and classify objects based on a common attribute.
- Use real materials to display information.
- Collect, organize, describe and display information.
- Practice ways of recording, organizing and analyzing data.
- Construct and interpret and write about real graphs, pictographs and bar graphs.
- Recognize penny, nickel, dime and quarter and dollars.
- Recognize value of penny, nickel, dime and quarter and dollars.
- Compare value of sets of coins.
- Tell time to the hour and half-hour on analog and digital clocks.
- Describe qualitative change over time, such as growing taller, hotter and colder.
- Use concept of cause and effect to make and verify predictions about what will occur.
- Sequence time events.
- Use calendars to explore time concepts.
- Sequence events in stories and time periods.
- Use appropriate technology to enhance the understanding of measurement.

Geometry

- Explore attributes of two-dimensional shapes.
- Identify, discuss, and describe the properties of plane and solid shapes using concrete and pictorial models.
- Use terms such as straight, curved and flat to describe position and order of shapes.
- Classify the properties of plane and solid shapes using concrete and pictorial models.
- Use a variety of materials to construct various shapes and explore their attributes
- Use positional language, such as under, over, in front of, next to, near, to describe position and order.
- Create designs and work with puzzles to develop the concepts of symmetry and of transformations (reflections, rotations and transformations)
- Model the properties of plane and solid shapes using concrete, and pictorial models.
- Draw and/or reproduce common two-dimensional geometric shapes.

- Explore and discuss and write about spatial relationships using activities that involve direction, orientation, combining, dividing, and transforming shapes with concrete and pictorial models.
- Identify common geometric shapes found in the world around them (art, nature, classroom or at home)
- Construct and discuss and write about patterns and designs using geometric shapes
- Use appropriate technology to enhance the understanding of geometry.

Measurement

- Use numbers to measure.
- Use non-standard units and tools for estimating and verifying measures of length, area, weight and volume.
- Visually estimate length, area and volume using various units.
- Order 3 to 10 objects on the basis of one attribute such as length.
- Use comparative and qualitative measurement (more, less, equal, taller, shorter, heavier, lighter, colder, and hotter).
- Use common instruments such as measuring cups and simple balance scales to measure approximate capacity and weight.
- Discuss, solve and write about problems involving measurement skills.
- Use appropriate technology to enhance the understanding of measurement.

Fractions

- Identify whole and half and quarter.
- Separate a shape in half.
- Separate a set in half.
- Use appropriate technology to enhance the understanding of fractions.

Addition & Subtraction to 20 with 2 Digit Numbers

- Develop and begin to use mental math strategies and skills.
- Develop verbalize and extend the meaning of addition
- Develop verbalize and extend the meaning of subtraction
- Demonstrate fluency with basic facts to 20.
- Model real-world problems and write about using number sentences to describe situations.
- Explore function activities such as “function machines” or input-output processes.
- Use appropriate technology to enhance the understanding of addition and subtraction.

GRADE 2

MATHEMATICS

Math and its application are constantly being developed. To that end we offer a program that emphasizes problem solving and mathematical relationships. The program incorporates a variety of manipulative materials and strategies to teach and reinforce mathematical concepts. The following represents the objectives introduced during grade 2.

Ongoing activities: Calendar, Graphing, Estimation, and Probability

- Use calendars daily to explore time concepts (days of the week, months of the year).
- Collect, organize, describe and display information.
- Use tallies.
- Use real materials to display information.
- Construct, interpret and write about real graphs, pictographs and bar graphs.
- Explore ways of recording, organizing and analyzing data.
- Develop, use and write about estimation strategies and skills.
- Estimate and verify the number of objects (maximum 20).
- Use estimation strategies to express & dictate the reasonableness of an answer.
- Estimate sets of objects in terms of more than, less than, or same without counting.
- Use concept of chance to make and verify predictions.
- Record, discuss and write about results from simple probability activities and engage in chance activities using materials such as number cubes and spinners.
- Make and test predictions.
- Discuss the likelihood that various events will occur.
- Use concept of cause and effect to make and verify predictions about what will occur.
- Discuss and write about real life experiences using simple proportions with concrete materials (e.g., if there are 40 cookies and 20 students how many cookies may each student have?)
- Recognize simple patterns in a variety of contexts including songs, nursery rhymes and everyday life.
- Explore & identify numerical patterns.
- Identify and use ordinal numbers first through fifth.
- Engage in systematic listening, counting and reasoning.
- Follow and describe simple procedures and directions.
- Explore a variety of mathematical ideas through puzzles games and counting problems.
- Develop and begin to use mental math strategies and skills.
- Write a story problem.
- Use appropriate technology to enhance the understanding of mathematical concepts.

Understanding Numbers and Operations

- Order and compare numbers 1-100
- Identify points representing whole numbers on a number line
- Use correct mathematical vocabulary to describe quantitative relationships (such as same as, more than, less than)
- Order numbers before, after, and between

- Identify and order numbers ordinally
- Identify and order odd and even numbers
- Use skip counting to order numbers
- Explore and develop strategies for rounding numbers (tens, hundreds, or thousands)

Understanding Numbers & Operations & Data & Graphing

- Count, identify, write and provide pictorial representation for numbers 1-100
- Relate number word to the numerals 1-20
- Order whole numbers to 100
- Construct number meanings through real world experiences, the use of physical materials such as base ten blocks and pictorial and written representation
- Read and write numbers to 1,000
- Solve problems involving 1 more or less and 10 more or less
- Identify alternative forms of expressing whole numbers using regrouping to 10's
- Use expanded notation to demonstrate understanding of place value to 100
- Use place value to 100 to interpret meaning of numbers

Understanding Numbers & Graphing

- Order and compare numbers 1-100
- Identify points representing whole numbers on a number line
- Use correct mathematical vocabulary to describe quantitative relationships (such as same as, more than, less than)
- Order numbers before, after, and between
- Identify and order numbers ordinally
- Identify and order odd and even numbers
- Use skip counting to order numbers
- Explore and develop strategies for rounding numbers (tens, hundreds, or thousands)

Money

- Identify coins of a penny, nickel, dime, quarter, and half dollar
- To identify different ways to make the same amount
- To count on to find total amounts
- To count mixed collection of coins
- To use the decimal notation and the dollar symbol for money
- To compare amounts to prices; to count on from prices to make change
- Develop and use strategies to solve word problems
- Use technology to enhance development of counting money

Time

- Tell time to the hour using analog and digital clocks
- Tell time to the hour, half and quarter hour
- To tell time to five minutes
- To tell time after the hour
- To tell time before the hour
- To apply concepts about telling time
- To determine the time at which an event happens and determines A.M. and P.M.

- Read a calendar
- Sequence events in stories and time periods
- Sequence time events

2 Digit Addition

- Identify tens patterns in a number chart
- Add tens
- Count on tens and ones
- Show adding 1 digit to 2 digits on Place Value Mat using regrouping
- Demonstrate adding ones to tens using regrouping
- Add two digit numbers
- Use technology to enhance the concept of two digit addition

2 Digit Addition with Regrouping

- Use of # chart to count on
- Practice place value concepts and addition with and without regrouping
- To estimate sums of 2 digit numbers
- Use mental math to find sums
- Identify and or write the appropriate 2 digit operations or number sentence to solve a word problem
- Use technology to enhance development of addition with regrouping

2 Digit Subtraction

Identify tens patterns in a number chart

- Subtract tens
- Count back tens and ones
- Show subtracting 1 digit to 2 digits on Place Value Mat using regrouping
- Demonstrate subtracting ones to tens using regrouping
- Subtract two digit numbers
- Use technology to enhance the concept of two digit subtraction

2 Digit Subtraction with Regrouping

- Use of # chart to count back
- Practice place value concepts and subtraction with and without regrouping
- To estimate sums of 2 digit numbers
- Use mental math to find sums
- Identify and or write the appropriate 2 digit operations or number sentence to solve a word problem
- Use technology to enhance development of subtraction with regrouping

Geometry and Measurement

- Identify, classify, model, describe, discuss, and compare the properties of plane and solid figures, using concrete and pictorial models.
- Create and describe mental images of geometric shapes and figures
- To identify the sides and corners of plane shapes
- Draw and construct models of plane and solid shapes

- Identify line symmetry using concrete and pictorial models
- Identify similar and congruent figures using concrete and pictorial models
- Identify and draw transformation of polygons
- To match plane figures to faces of solids
- Construct, discuss, and write about patterns and designs using geometric shapes

Number Sense and Fractions

- Read and write numbers to 1,000
- Identify numbers that are 100 less and 100 more than a given number
- Use the greater-than, less-than and equal symbols to compare two three digit numbers
- Identify the number that is just after, just before and between numbers to 999.
- Use a number line to put sets of 3-digit numbers in order.

3 Digit Addition with Regrouping

- To add hundreds using basic facts
- Practice place value concepts and addition with and without regrouping
- To estimate sums of 3 digit numbers
- Use mental math to find sums
- To model and add 3-digit numbers and determine when regrouping of tens is needed
- Identify and or write the appropriate 3 digit operations or number sentence to solve a word problem
- To add money with 3-digit numbers
- Use technology to enhance development of addition with regrouping

3 digit Subtraction with Regrouping

- To subtract hundreds using basic facts
- Practice place value concepts and subtraction with and without regrouping
- To estimate sums of 3 digit numbers
- Use mental math to find sums
- To model and subtract 3-digit numbers and determine when regrouping of tens is needed
- Identify and or write the appropriate 3 digit operations or number sentence to solve a word problem
- To subtract money with 3-digit numbers
- Use technology to enhance development of subtraction with regrouping

Multiplication and Division

- To explore multiplication through skip counting
- To model equal groups and use repeated addition and multiplication sentences to find how many in all
- To model arrays to show multiplication
- To learn how to multiply numbers many order
- To learn how to multiply numbers in vertical and horizontal formats.
- To learn to multiply with 2, 5, and 10
- To use logical reasoning to memorize multiplication facts

- To show problem solving strategies in multiplication strategies through writing and discussion
- Use technology to enhance development of multiplication

GRADE 3

MATHEMATICS

Norwalk's grades 3-5 math program is based on the belief that all our students can be successful in the study of mathematics. The main goals of our program are learning to value mathematics, becoming confident in one's own ability, becoming a mathematical problem solver, learning to communicate mathematically and learning to reason mathematically.

Understanding Numbers and Operations

- Add and subtract numbers to 18 with 100% accuracy.
- Use a hundred chart to skip-count and identify odd and even numbers.
- Read, write, identify and interpret numbers to the ten thousands.
- Use expanded notation/form (to 1,000) to demonstrate understanding of place value.
- Construct a pictorial and written representation of numbers using base ten.
- Solve problems involving 1 more or less, 10 more or less.
- Develop and use problem solving skills and strategies:
- Use logical reasoning
- Identify relationships
- Predict and test
- Estimate or exact number
- Draw reasonable conclusions from tables, graphs and charts.
- Order whole numbers to thousands.
- Round up and round down numbers.
- Develop and demonstrate strategies for rounding numbers.
- Identify points representing whole numbers on a number line.
- Engage in, then discuss and write about activities involving operations using concrete, pictorial and symbolic models.
- Estimate sums and differences.
- Develop and use a variety of estimation strategies, and justify the application.
- Add and subtract 2- to 4- digit numbers without regrouping.
- Add 2- to 4- digit numbers with regrouping.
- Identify alternate forms of expressing whole numbers using regrouping.
- Develop and use a variety of mental computation strategies.
- Select and apply appropriate procedures for computation such as mental math, estimation, etc.
- Develop and verbalize concept of regrouping in subtraction.
- Identify and/or write the appropriate operation or number sentence to solve a story problem.
- Write story problems that can be solved from addition and subtraction number sentences.
- Recognize and make appropriate estimations, as distinct from the exact response.
- Use mathematical language and symbols related to expressions and number sentences.
- Solve addition and subtraction problems that relate to real-world experiences, and explain in writing how the solutions were determined.
- Use appropriate technology to enhance the development of number sense, addition, subtraction and estimation.

Money and Time

- Make equivalent sets of money by using coins and bills.
- Develop and use problem solving skills and strategies:
- Make a chart
- Compare amounts of money.
- Use the strategy counting on to make change.
- Add and subtract money amounts.
- Tell time to the nearest minute using analog and digital clocks and express the given time in a variety of ways including A.M. and P.M.
- Write, solve and discuss story problems involving time and elapsed time.
- Use a schedule/calendar to determine elapsed time
- Develop and use problem solving skills and strategies:
- Sequence events

Multiplication Concepts and Facts

- Use mathematical language and symbols related to operations to connect multiplication to repeated addition.
- Use the Order Property, Zero Property and Property of One to master multiplication facts.
- Demonstrate fluency with multiplication facts with 0,1,2,3,4 and 5 with 100% accuracy.
- Engage in, then discuss and write about activities involving multiplication using concrete, pictorial and symbolic models (including rectangular arrays).
- Develop and use problem solving skills and strategies:
- Too much-too little information
- Find a pattern
- Draw a picture
- Multi-step problems
- Use a multiplication table to find missing factors.
- Develop multiplication facts with 6, 7, 8, 9 and 10.
- Develop and use a variety of mental computation strategies.
- Write story problems that can be solved from multiplication number sentences.
- Solve multiplication problems that relate to real-world experiences, and explain in writing how the solutions were determined.
- Select and apply appropriate procedures for computation such as mental math, estimation, pencil and paper, and calculator, and check for the reasonableness of the response.
- Multiply with 3 factors and use the Grouping (Associative) Property of Multiplication.
- Recognize a rule in a linear pattern and extend the pattern.
- Use appropriate technology to enhance the development of multiplication.

Division Concepts and Facts

- Use mathematical language and symbols related to operations to connect division to subtracting equal amounts and relate division to multiplication.
- Demonstrate fluency with division facts with 0,1,2,3,4 and 5 with 100% accuracy.
- Engage in, then discuss and write about activities involving division using concrete, pictorial and symbolic models (including rectangular arrays).
- Develop and use problem solving skills and strategies:
- Write a number sentence
- Choose the operation

- Work backward
- Develop division facts with 6, 7, 8, 9 and 10.
- Develop and use a variety of mental computation strategies.
- Write story problems that can be solved from division number sentences.
- Solve division problems that relate to real-world experiences, and explain in writing how the solutions were determined.
- Select and apply appropriate procedures for computation such as mental math, estimation, pencil and paper, and calculator, and check for the reasonableness of the response.
- Use appropriate technology to enhance the development of division.

Data, Graphing, and Probability

- Explore ways for systematically organizing, recording and analyzing data.
- Develop and use problem solving strategies:
 - Make a Table
 - Make a Graph
 - Draw Conclusions
- Identify information from tables, graphs and charts.
- Construct and interpret pictographs, bar graphs and line graphs
- Draw reasonable conclusions from tables, graphs and charts.
- Discuss the likelihood that chance events will happen
- Make and test predictions
- Explore the fairness of games using spinners and dice
- Use appropriate technology to enhance the development of an understanding of statistics and probability

Geometry

- Identify, classify, model, describe, discuss, and compare the properties of plane including circles and solid figures.
- Create and describe mental images of geometric shapes and figures.
- Identify types of lines, line segments, and rays and to classify angles as greater and less than a right angle.
- Identify symmetry and line of symmetry using concrete and pictorial models.
- Identify similar and congruent figures using concrete and pictorial models.
- Use geometric shapes to explore mathematical concepts such as area and perimeter.
- Recognize and extend geometric patterns involving transformations (rotations, translations and reflection).
- Develop and use problem solving strategies and skills:
 - Solve a simpler problem
 - Find a pattern
 - Make a list
- Use appropriate technology to enhance the development of geometry.

Measurement

- Use standard and non-standard measurements to develop concepts of length, temperature, mass, weight, perimeter, area, and volume/capacity.
- Use measurement tools such as rulers, scales, and thermometers.

- Estimate and measure length, distance, capacity and weight by using appropriate customary and metric units.
- Measure geometric figures and shapes.
- Estimate and measure perimeter, area and volume.
- Identify an appropriate customary or metric measure for a given situation.
- Develop and use problem solving skills and strategies:
 - Use a graph
 - Make a Table
- Use rules to change units of length and capacity.
- Use appropriate technology to enhance the development of measurement.

Fractions and Decimals

- Identify, count, label and construct common fractional parts of sets and understand their relationship to the whole
- Use fraction bars to model and write equivalent fractions.
- Use visual models to compare and order commonly used fractions
- Read and write mixed numbers.
- Develop and use problem solving skills and strategies:
 - Make a model
 - Reasonable Answers
 - Solve a Simpler Problem
- Use fraction bars to add and subtract like fractions
- Model, read and write decimals in tenths and hundredths
- Use visual models to compare and order decimals
- Write and compare money using fractions and decimals
- Add and subtract decimals and money
- Use appropriate technology to enhance the development of an understanding of fractions and decimals

Multiply and Divide by 1-Digit Numbers

- Use rectangular arrays to multiply 2 digit numbers.
- Record the steps of multiplying 2 digit numbers and the products of 1 digit and 2 digit numbers.
- Develop and use problem solving skills and strategies:
 - Choose the Operations
- Use models and counters to divide with remainders
- Use models and counters to divide with remainders
- Record the steps of dividing 2 digit numbers using an algorithm
- Develop and use problem solving skills and strategies:
 - Interpret the Remainder
- Use appropriate technology to enhance the development of multiplication and division

GRADE 4

MATHEMATICS

Norwalk's grades 3-5 math program is based on the belief that all our students can be successful in the study of mathematics. The main goals of our program are learning to value mathematics, becoming confident in one's own ability, becoming a mathematical problem solver, learning to communicate mathematically and learning to reason mathematically.

CMT - Third Generation

- Solve problems involving 1 and 10 more or less
- Identify alternative forms of expressing whole numbers using expanded forms.
- Identify alternative forms of expressing whole numbers using regrouping
- Use place value concepts to interpret the meaning of numbers
- Relate pictorial representations using base ten blocks to whole numbers and vice versa
- Identify, label or shade fractional parts of regions and sets
- Order whole numbers
- Describe the magnitude of whole #'s
- Round whole numbers in context
- Identify points representing whole numbers on a number line and vice versa
- Relate multiplication and division facts to rectangular arrays and pictures
- Identify or write the appropriate operation or number sentence to solve a story problem
- Write story problems from addition and subtraction numbers sentences
- Add and subtract facts to 18
- Multiply and divide by 2,5, and 10
- Add and subtract 1- and 2- digit numbers without regrouping
- Add and subtract 1- and 2- digit numbers with regrouping
- Solve simple story problems involving addition and subtraction
- Solve simple story problems involving addition and subtraction with extraneous information
- Identify the best expression to fine an estimate
- Determine a reasonable estimate and describe the strategy used to make the estimate
- Estimate a reasonable answer to a problem
- Use estimation to make and defend decisions.
- Tell time to the nearest hour, and quarter-hour using analog and digital clocks
- Solve problems involving time, elapsed time and calendars
- Estimate lengths and areas
- Measure or draw lengths to the nearest inch or centimeter
- Identify an appropriate customary or metric measure for a given situation
- Identify geometric shapes and figures including the number of angles and sides of polygons
- Draw geometric shapes and figures
- Identify correct information from graphs, tables and charts
- Create bar graphs and pictographs from data in tables and charts?
- Solve problems involving elementary notions of probability
- Extend or complete patterns involving whole numbers and attributes and identify or state rules for given patterns
- Identify objects that are the same or different by one attribute

- Sort objects into two groups by a common attribute
- Solve extended numerical problems
- Solve extended statistical problems

Number and Operations

- Demonstrate fluency with basic facts (1 –18) of addition and subtraction using multi digit numbers
- Read, write, identify, and interpret numbers through millions
- Use place value to interpret numbers 10 more and less and 100 more and less and interpreting the meaning of numbers to 1,000,000
- Construct a pictorial and written representation of numbers using base ten
- Read, identify, and write in words and numbers expanded notation/form to express whole numbers less than 10,000
- To identify alternative forms of expressing whole numbers using regrouping to the 1000's
- Create Graphs and Tables
- Locate, identify, and order whole numbers and money on number lines and scale.
- Round up and round down whole numbers
- Develop fluency and understanding of the relationship between adding and subtracting.
- Subtract whole numbers with regrouping and regrouping with zeroes
- Develop and explain a variety of mental computations
- To use estimation to check the reasonableness of answers to whole numbers.
- Write story problems which can be solved from addition/subtraction number sentences involving 100 more or less and 1000 more or less
- Explore and develop the concept of order of operations
- Use mathematical language and symbols related to operations
- To organize and find a rule using variables
- Using variables solve and explain one-step and simple two-step equations using money and making change
- Solve extended and statistical problems and explain in writing how solutions were determined
- Solve and justify solutions to multi-step word problems that relate operations to real world experiences and write about it
- Use appropriate technology to enhance the development of addition, subtraction and estimation

Data, Graphing and Time

- To explore a variety of ways for systematically recording, organizing and analyzing data
- Determine, analyze and apply the concepts of average, range, median in many different situations
- To choose, construct, compare and interpret data by using a variety of graph forms (line, circle, bar, and pictographs) and scales
- To solve problems by using an appropriate strategy such as *make a graph* and write about it
- Formulate a question and then generate, collect, organize and display data to answer the questions

- To tell time to the nearest minute and second on analog and digital clocks
- Create, solve, write about problems involving elapsed time measured in days, hours, and minutes and seconds and justify answers.
- To solve problems by using an appropriate skill such as sequence information and write about it.
- Use appropriate technology to enhance the development of development of addition, subtraction and estimation

Multiplication and Division

- To relate multiplication and division
- To demonstrate fluency using multiplication and division using basic facts from 0 through 12
- Extend or complete patterns using arrays, skip counting, fact families, and multiplication tables, involving whole numbers (including 10 and 100) and attributes and identify or state rules for given patterns
- Write and explain story problems that can be solved from multiplication and division number sentences
- Explore and develop the concept of order of operations
- Solve and justify solutions to multi-step problems that relate operations to real-world experiences
- To keep both sides of an equation equal by using multiplication
- To write and evaluate an expression with a variable
- Use a variety of materials to recognize, describe, extend, analyze, construct, and explain numeric sequences and explain the rule.
- To solve problems using the strategy *work backward* and write about it
- Use appropriate technology to enhance the development of addition, subtraction and estimation

Multiply by 1 and 2 Digit Numbers

- To multiply mentally using basic facts and patterns
- Develop and explain a variety of mental computations and estimation strategies.
- To model multiplication using base-ten blocks
- Relate multiplication and division facts to rectangular arrays and pictures
- Identify the appropriate operation or number sentence to solve a story problem and write about it
- To multiply 2,3,4 - digit numbers by 1-digit numbers (using regrouping)
- To solve problems by using the strategy *write an equation* and write about it
- To explore a variety of ways for systemically recording, organizing and analyzing data.
- Demonstrate fluency of numbers by using basic facts and patterns
- To write products of 2 digit whole numbers by multiples of 10
- To estimate products by rounding factors
- To read, write, and identify the value of whole numbers using models of expanded form
- To solve multi step word problems and write about it
- Use appropriate technology to enhance the development of multiplication

Divide by 1 and 2 Digit Divisors

- To divide numbers that do not divide evenly

- To model division using base – ten blocks
- To divide by 1-digit number, using division procedures, involving 2, 3 digit numbers
- To use the problems solving strategy *predict* and *test* and write about it
- To use basic facts and patterns to find quotients mentally
- To use compatible numbers to estimate quotients
- To use place value to place the first digit in a quotient and to decide what each digit should be
- To divide when a zero is in the dividend or in the quotient
- To decide how to interpret the remainder in a division problem
- Determine, analyze and apply the concepts of average, range, and median in many different situations.
- Develop and explain a variety of mental computations and estimation strategies
- To model division of 2-digit divisors using base-ten blocks
- To correct quotients when the estimate is too high or too low
- To identify and choose the correct operation and explain your answer
- To find factors and multiples using a multiplication table and arrays
- The identify and explain the differences between prime and composite numbers
- Use a variety of materials to recognize, describe, extend, analyze, construct, and explain numeric sequences and explain the rule.
- Recognize patterns and trends, make predictions, and justify conclusions based on data from tables, graphs, charts, and word problems using verbal and written explanations.
- Use appropriate technology to enhance the development of division.

Geometry

- To visualize, create, describe and draw images of objects patterns locations and points.
- Identify and label lines, rays, and angles and their relationships
- Identify and label intersecting, parallel, and perpendicular lines
- Identify congruent and similar figures and predict the results of flips, slides, and turns
- Explore, identify and demonstrate understanding of transformations, (translations, reflections, and rotations) with geometric shapes, patterns and designs.
- To identify, describe and use the problem solving strategy *make a model* to solve problems involving similar figures and symmetry and write about it
- To relate angle measures to one-fourth, one-half, three fourths, and full turns and measure these angles in degree
- Construct and measure geometric shapes with appropriate tools such as rulers, protractors, compasses, isometric dot paper and computers
- To identify the parts of a circle
- To explore finding the circumference of a circle
- Identify, describe, model, classify, discuss, write about and compare shapes and their properties.
- To identify and build three-dimensional objects from two-dimensional representations of those objects
- To use the strategy *draw a diagram* to solve problems and write about it
- Use appropriate technology to enhance the development of geometry

Fractions and Decimals

- Develop an understanding of fractions as a division of whole numbers and part of set.
- Relate fractions to concrete, pictorial and symbolic representation.
- To read and write fractions
- To model equivalent fractions with fraction bars and number lines
- To find equivalent fractions
- Recognize and generate equivalent forms of commonly used fractions.
- To use equivalent fractions in order to solve problems
- To compare and order fractions
- To compare and order fractions using symbols, $>$, $<$, and $=$.
- To solve problems using the strategy *make a model* using a number line and explain why
- To read and write mixed numbers and to express fractions greater than 1 as a mixed number
- To add with the same denominator fractions
- To subtract with the same denominator fractions
- To add and subtract fractions in order to solve word problems
- To develop, demonstrate, verbalize, and write about the various meanings of addition and subtraction with fractions using concrete, pictorial, and symbolic models.
- To add and subtract word problems
- To solve problems by using the strategy choose *the operation* using fractions and explain why
- To add and subtract unlike fractions
- Relate decimals to concrete, pictorial and symbolic representations.
- To read and write fraction and decimal parts, tenths and hundredths
- To explore decimals to the thousandths
- To read and write equivalent decimals
- To relate mixed numbers and decimals
- To compare and order decimals
- To use the problem solving strategy *use logical reasoning* when using decimals and explain why
- To round decimals using rounding rules and number lines in context of number and word problems and data and explain
- To estimate decimal sums and differences
- To add sums of decimals
- To subtract differences of decimals
- To solve word problems using the skill *evaluate the reasonableness of answers* using decimals and explain why
- Use appropriate technology to enhance the development of fractions and decimals

Measurement and Geometry

- To identify and use appropriate customary units of measure.
- Identify and use appropriate tools to measure in customary units, $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$.
- To change linear units of measure by multiplying or dividing.
- To find the capacity of containers using customary units.
- To measure the weight of objects in customary units
- Develop, apply, explain and write about a variety of estimation strategies in problem and real world situations involving quantities and measures

- Identify and use appropriate customary and metric units.
- Solve and write about problems involving conversions of measures within customary and metric systems.
- To find the capacity of containers using the metric units milliliter and liters.
- To measure the mass of objects in metric units.
- To solve problems by using the strategy *draw a diagram* and write about it.
- To identify polygons and find the perimeter of polygons by adding the lengths of the sides.
- To use formulas to find and estimate the perimeter of polygons.
- To recognize when estimation is appropriate and understands the usefulness of an estimate.
- Recognizing when estimation is appropriate and understand the usefulness of an estimate.
- Identify concepts of area and perimeter and relate them to geometric shapes
- To use formulas to find unknown lengths of polygons when the area or perimeter is known
- Solve measurement problems using length, perimeter and area.
- Identify, describe, model, classify, discuss and write and compare shapes and their properties, (including, faces, edges, and vertices).
- Use a variety of materials to recognize, describe, extend, analyze, construct and explain geometric patterns and explain the rule.
- Develop the concept of volume using concrete materials and models
- To solve volume problems using the skill *too much/too little information* and write about it.
- Investigate, explore, describe and write about geometry in nature and real-world applications using models, manipulatives, and appropriate technology

Probability, Algebra, and Graphing

- Use experimental probability to make and test predictions and write results.
- To find the number of possible outcomes using a tree diagram
- To solve problems by using the strategy *make an organized list* and write about it.
- To explore the probability of events that are certain or impossible.
- To represent probability as a fraction.
- Recognize patterns and trends, make predictions and justify conclusions based on data from tables, graphs, and charts
- To decide whether or not a game is fair
- Solve problems involving probability and fairness and justify answers.
- To read a Fahrenheit thermometer?
- To read a Celsius thermometer?
- Develop, solve and write about measurement problems using multiple strategies using temperature
- To locate and name negative numbers by using a number line and counting techniques.
- To solve problems by using the facts and making a generalization or prediction and write about it
- Represent and demonstrate understanding of ordered pairs on a coordinate grid
- Investigate how a change in one variable relates to a change in a second variable.
- To show on a coordinate grid some of the x and y values that make an equation true
- To use the skill *identify the relationships* to solve the problem and write about it
- To use concrete and pictorial representations to develop and understanding of percent.

- To use units to identify and find equivalent rates (i.e. 5 girls out of 15 students is equivalent to 1 girl out of 3 students)
- Use appropriate technology to enhance the development of addition, subtraction and estimation

GRADE 5

MATHEMATICS

Norwalk's grades 3-5 math program is based on the belief that all our students can be successful in the study of mathematics. The main goals of our program are learning to value mathematics, becoming confident in one's own ability, becoming a mathematical problem solver, learning to communicate mathematically and learning to reason mathematically.

Use Whole Numbers and Decimals

- Demonstrate fluency with basic facts (1-98) of addition and subtraction using multi-digit numbers.
- Read, write, identify and interpret place value of numbers through billions.
- Read, Identify and use expanded form/notation to bill ions
- Read, identify, and write in standard form, words/numbers expanded notation/ form.
- Compare/order whole numbers to hundred millions.
- Solve problems by using appropriate problem solving skills.
- Read, and identify decimals to ten-thousandths
- Identify and write equivalent decimals
- Compare and order decimals to ten-thousandths.
- Round whole numbers to a given place value (millions)
- Solve problems when using appropriate problem solving skills such as *draw conclusions*.
- Estimate sums and differences by rounding.
- Add and Subtract multi-digit numbers to ten- thousands.
- Use mental math strategies to find sums and differences
- Solve problems using *logical reasoning*.
- Round decimals to the ten-thousandth place
- Locate, identify, and order decimals on a number line
- Estimate decimal sums and differences by rounding.
- Add and subtract decimal amounts to thousandths.
- Subtract whole numbers with regrouping.
- Subtracting across zeros
- Problem Solving: Using Estimation or exact answers
- Use appropriate technology to enhance the development of number sense and decimals.

Algebra

- Write and evaluate numerical and algebraic expressions involving addition and subtraction
- Write simple algebraic equations
- Write and solve equations by finding values for variables.
- Identify the commutative and associative properties to solve problems.
- Use a formula to solve problems
- Recognize variables and find the value of an expression
- Use the order of operations to evaluate expressions.
- Problem Solving; use strategy *write an equation* to solve problems
- Write and solve multiplication equations by using mental math & multiplication properties.
- Use the distributive property of multiplication.

- Collect and organize data in tables and line plots
- Compute & interpret the range, mean, median, and mode of a set of data.
- Read, interpret, and analyze data in a graph.
- Choose appropriate scales and intervals for graphs.
- Solve problems using strategy of Create a graph
- Use ordered pairs of numbers to graph or identify points on a grid
- Make a line graph to show how data changes over time.
- Display and interpret data in histograms
- Choose the best graph for set of data.
- Use a calculator to explore order of operations.

Multiplying Whole Numbers

- Write estimates and products for whole numbers.
- Multiply multi-digit numbers by 1-2 digit numbers.
- Choose mental math paper/pencil or a calculator to multiply whole numbers.
- Use mental math and patterns to find decimal products.
- Multiply decimals by decimals, including money.
- Use estimation and patterns to place the decimal point.
- Use the problem solving skill *Make Decisions*
- Use appropriate technology to enhance the development of number sense, addition, and multiplication.

Divide Whole Numbers & Decimals

- Write estimates by using compatible numbers
- Write quotients for multi-digit whole numbers by a single digit divisor
- Use zeros in division
- Evaluate expressions and write/solve equations by using division
- Solve problems by using an appropriate problem solving skill such as *interpret the remainder*
- Use patterns and basic facts to write quotients
- Solve problems by using an appropriate problem solving strategy such as *predict and test*
- Use patterns and basic facts to write quotients for decimals divided by whole numbers
- Write quotients for decimals divided by 1-2 digit whole numbers
- Write conversions of fractions to decimals
- Solve problems by using an appropriate problem strategy such as *compare strategies: work backward or draw a diagram*
- Use patterns of zeros and basic facts to write quotients for decimals divided by decimals.
- Write quotients for decimals divided by decimals
- Solve problems by using an appropriate problem solving skill such as choose the operation
- Use appropriate technology to enhance the development of division, fractions and decimals.

Number Theory

- To learn divisibility rules.
- To find multiples and the LCM of a set of numbers.
- To find factors and the GCF of a set of numbers.
- To solve problems by using the skill *identify relationships*.

- To identify prime and composite numbers and find the prime factorization of a composite number.
- Express numbers as powers of ten.
- To identify exponents and to write and evaluate expressions using exponents.
- To represent numbers as decimals and fractions.
- To find equivalent fractions including fractions in simplest form.
- Compare and order fractions with unlike denominators.
- Use common factors or the GCF to write fractions in simplest form.
- To rename fractions as mixed numbers and mixed numbers as fractions.
- To solve problems by using the strategy *make a model*.
- Use appropriate technology to enhance the development of fractions and decimals.

Operations with Fractions

- Estimate sums or differences of fractions
- To write sums and differences of like fractions
- To find the least common denominator and to write sums and differences of unlike fractions.
- To use the strategy *work backward* to solve problems
- To add & subtract mixed numbers by using fraction bars and LCD.
- To add and subtract mixed numbers with renaming
- To solve multi-step problems.
- To write products of whole numbers and fractions.
- To write products of fractions and fractions.
- To write products of fractions and mixed numbers;
- To multiply two mixed numbers.
- To solve problems by using the problem solving skill sequence and prioritize information.
- Use appropriate technology to compute fractions & mixed numbers.

Algebra and Geometry

- To use a number line to find opposite and absolute values of integers.
- To use a number line to compare & order integers.
- To add with positive and negative integers and to subtract positive integers from negative integers.
- To use problem solving strategy to *draw a diagram*.
- To identify and represent relationships on a coordinate plane.
- To identify, write, and graph ordered pairs on a coordinate plane.
- To use function tables to write equations and graph relationships.
- To solve problems by using an appropriate problem solving skill such as relevant/irrelevant information.
- To identify different kinds of angles and line relationships
- To use a protractor to measure angles.
- To use angles to classify and measure polygons.
- To draw a circle and identify and measure its parts.
- To identify similar and congruent figures.
- To identify multiple lines of symmetry.
- To use appropriate technology to enhance the development of spatial relationships & Geometry.

Measurement

- To estimate, measure, and write length in both customary and metric units.
- To change units of length within customary or metric systems and to estimate conversions of temperature.
- To change or select appropriate units of capacity and weight.
- Problems by using an appropriate problem solving strategy such as *make a table*
- To use the appropriate formula to find the perimeter of a polygon
- To use the appropriate formula to find the circumference of a circle.

Ratio, Percent and Probability

- To use ratio to represent the relationship between two quantities.
- To express ratio in three ways.
- To identify and write equivalent ratios and proportions.
- To interpret scale drawings using ratios.
- To solve problems by using the skill *evaluate too much/too little information*.
- To represent percent as part of a hundred.
- To write a percent as a decimal and a decimal as a percent.
- To write percents as fractions and decimals, and to write fractions and decimals as percents.
- To find a percent of a number.
- To use the problem solving strategy *make a graph* to solve problems.
- To use percents in *circle graphs* when comparing data sets.
- To predict and write outcomes of probability experiments.
- To organize possible outcomes by making a *tree diagram*.
- To express the probability of an event as a fraction.
- To compare probabilities of separate events.
- To solve problems by using appropriate problem solving strategies such as *make an organized list*.
- To use technology to enhance Ratios, Probability and Statistics