

**THE FOLLOWING STATE CURRICULUM STANDARDS ARE ADDRESSED BY
THE QUARTER MILE MATH SOFTWARE
FOR THE STATE OF NEVADA**

Grades K - K

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand Titles that Address the Substrand

(Gr. K) 5.K.1 Collect and describe data.(Data Collection and Organization)

Subject: MATH

Standard: Mathematical Communication

Strand: Students will develop their ability to communicate mathematically by solving problems in which there is a need to obtain information from the real world through reading, listening, and observing in order to: translate this information into a mathematical language and symbols; process this information mathematically; and present results in written, oral and visual formats.

Substrand Titles that Address the Substrand

(Gr. K-12) 7.1 Discuss and exchange ideas about mathematics as a part of learning.

(Gr. K-12) 7.2 Use inquiry techniques (e.g. discussion, questioning, research, data gathering) to solve mathematical problems.

(Gr. K-2) 7.4 Use pictorial representations to identify mathematical operations and concepts.

Quarter Mile Math Level 1

(Gr. K-3) 7.7 Use physical materials, models, pictures, or writing to represent and communicate mathematical ideas.

(Gr. K-5) 7.10 Explain and justify thinking about mathematical ideas and solutions.

(Gr. K-12) 7.16 Use everyday language to explain thinking about strategies and solutions to mathematical problems.

(Gr. K-12) 7.17 Express mathematical ideas and use them to define, compare, and solve problems orally and in writing.

(Gr. K-6) 7.18 Use mathematical notation to communicate and explain mathematical situations.

Quarter Mile Math Level 3

Subject: MATH

Standard: Mathematical Connections

Strand: Students will develop the ability to make mathematical connections by solving problems in which there is a need to view mathematics as an integrated whole, identifying relationships between

context strands, and integrating mathematics with other disciplines, allowing the flexibility to approach problems in a variety of ways within and beyond the field of mathematics.

Substrand **Titles that Address the Substrand**

(Gr. K-12) 9.1 Link new concepts to prior knowledge.

(Gr. K-12) 9.5 Identify practical applications of mathematical principles that can be applied to other disciplines.

(Gr. K-12) 9.6 Apply mathematical thinking and modeling to solve problems that arise in other disciplines (e.g. rhythm in music and motion in science).

(Gr. K-12) 9.8 Identify, explain, and use mathematics in everyday life.

Subject: MATH

Standard: Mathematical Reasoning

Strand: Student will develop their ability to reason mathematically by solving problems in which there is a need to investigate significant mathematical ideas and construct their own learning in all content areas in order to justify their thinking; reinforce and extend their logical reasoning abilities; reflect on and clarify their own thinking; and ask questions to extend their thinking.

Substrand **Titles that Address the Substrand**

(Gr. K-4) 8.1 Justify and explain the solutions to problems using manipulative and physical models.

(Gr. K-12) 8.4 Use patterns and relationships to analyze mathematical situations; draw logical conclusions about mathematical problems.

(Gr. K-12) 8.8 Ask questions to reflect on, clarify, and extend thinking.

(Gr. K-12) 8.9 Review and refine the assumptions and steps used to derive conclusions in mathematical arguments.

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand **Titles that Address the Substrand**

(Gr. K) 3.K.1 Compare and order objects by size communicating their similarities and differences.(Comparison and Ordering)

(Gr. K) 3.K.4 Identify and sort pennies, nickels, and dimes.(Money)

Quarter Mile Math Level 1

(Gr. K) 3.K.6 Recite, in order, the days of the week.(Time)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number

relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand **Titles that Address the Substrand**

(Gr. K) 1.K.1 Use concrete objects to model simple sums and differences.(Facts)
Quarter Mile Math Level 1

(Gr. K) 1.K.5 Count to 20.(Computation)
Quarter Mile Math Level 1

(Gr. K) 1.K.6 Recognize, read, and write numerals from 0-10; recognize number words from 0-10.(Comparison and Ordering)
Quarter Mile Math Level 1

(Gr. K) 1.K.7 Estimate the number of objects in a set to 10 and verify by counting; use ordinal positions first to third.(Estimation and Rounding)
Quarter Mile Math Level 1

(Gr. K) 1.K.8 Match the number of objects to the correct numeral, 0-10.(Place value)
Quarter Mile Math Level 1

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand **Titles that Address the Substrand**

(Gr. K) 2.K.1 Sort and describe objects by similar attributes; recognize and replicate a pattern.(Patterns)

(Gr. K) 2.K.4 Identify and create sets of objects with unequal amounts, describing them as having more or less.(Number Sentences)

Subject: MATH

Standard: Problem Solving

Strand: Students will develop their ability to solve problems by engaging in developmentally appropriate problem solving opportunities in which there is a need to use various approaches to investigate and understand mathematical concepts in order to: formulate their own problems; find solutions to problems from everyday situations; develop and apply strategies to solve a wide variety of problems; and integrate mathematical reasoning, communication and connections.

Substrand **Titles that Address the Substrand**

(Gr. K-12) 6.1 Select, modify, develop, and apply strategies to solve a variety of mathematical and practical problems and to investigate and understand mathematical concepts.

Quarter Mile Math Level 1

Quarter Mile Math Level 2

Quarter Mile Math Level 3

(Gr. K-12) 6.2 Apply previous experience and knowledge to new problem-solving situations.

Quarter Mile Math Level 1

Quarter Mile Math Level 2

Quarter Mile Math Level 3

(Gr. K-2) 6.3 Formulate own problems; use various approaches to investigate and solve problems.

Quarter Mile Math Level 1

(Gr. K-3) 6.4 Explain and verify results with respect to the original problem.

(Gr. K-12) 6.6 Try more than one strategy when the first strategy proves to be unproductive.

(Gr. K-3) 6.8 Apply solutions and strategies from earlier problems to new problem situations.

(Gr. K-4) 6.12 Use technology, including calculators, to understand quantitative relationships, e.g., for skip counting and pattern exploration.

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand

Titles that Address the Substrand

(Gr. K) 4.K.1 Identify two-dimensional shapes (circles, triangles, rectangles including squares) regardless of position.(Two-Dimensional Shapes)

(Gr. K) 4.K.2 Use position words (e.g., middle, before, down) to place objects.(Transformations)

(Gr. K) 4.K.3 Identify two-dimensional figures (e.g., windows are shaped like rectangles) as they appear in the environment.(Coordinate Geometry and Line of Symmetry)

Grades 1 - 1

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand

Titles that Address the Substrand

(Gr. 1) 5.1.1 Collect, organize, and describe data.(Data Collection and Organization)

Quarter Mile Math Level 1

Subject: MATH

Standard: Mathematical Connections

Strand: Students will develop the ability to make mathematical connections by solving problems in which there is a need to view mathematics as an integrated whole, identifying relationships between context strands, and integrating mathematics with other disciplines, allowing the flexibility to approach problems in a variety of ways within and beyond the field of mathematics.

Substrand

Titles that Address the Substrand

(Gr. 1-12) 9.2 Use mathematical ideas from one area of mathematics to explain an idea from another area of mathematics.

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand Titles that Address the Substrand

(Gr. 1) 3.1.1 Compare and order objects by length and weight, communicating their similarities and differences.(Comparison and Ordering)

(Gr. 1) 3.1.2 Compare and measure length and weight, using non-standard measurement.(Measurement)

(Gr. 1) 3.1.4 Determine the value of any set of pennies, nickels, and dimes.(Money)

Quarter Mile Math Level 1

(Gr. 1) 3.1.6 Use a calendar to identify days, weeks, and months; read time to the nearest hour and half hour; distinguish between day and night, i.e., between A.M. and P.M.(Time)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand Titles that Address the Substrand

(Gr. 1) 1.1.1 Identify and model basic addition facts (sums through 10) and the corresponding subtraction facts.(Facts)

Quarter Mile Math Level 1

(Gr. 1) 1.1.3 Write, model, and describe one-step addition and subtraction problems.(Word Problems and Number Theory)

Quarter Mile Math Level 1

(Gr. 1) 1.1.4 Use decimals to show money amounts.(Decimals)

Quarter Mile Math Level 1

(Gr. 1) 1.1.5 Use the inherent patterns in numbers to count by 1s, 2s, 5s, and 10s to 100.(Computation)

Quarter Mile Math Level 1

(Gr. 1) 1.1.6 Read, write, order, and compare numerals from 0-100.(Comparison and Ordering)

Quarter Mile Math Level 1

(Gr. 1) 1.1.7 Estimate the number of objects in a set to 10; read and write number words to 10 and use ordinal positions first to tenth.(Estimation and Rounding)

Quarter Mile Math Level 1

(Gr. 1) 1.1.8 Use, model, and identify place value positions of 1s and 10s.(Place value)

Quarter Mile Math Level 1

(Gr. 1) 1.1.9 Identify and model a whole; identify and model +.(Fractions)

Quarter Mile Math Level 1

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand Titles that Address the Substrand

(Gr. 1) 2.1.1 Recognize, describe, extend, and create simple repeating patterns using symbols, objects, and manipulatives(Patterns)

(Gr. 1) 2.1.4 Create, compare, and describe sets of objects as having more, less, or equal amounts.(Number Sentences)

Quarter Mile Math Level 1

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand Titles that Address the Substrand

(Gr. 1) 4.1.1 Identify, name, sort, and sketch two-dimensional shapes (circles, triangles, rectangles including squares) regardless of position.(Two-Dimensional Shapes)

(Gr. 1) 4.1.2 Use position words (e.g., between, left, near) to describe location of objects.(Transformations)

(Gr. 1) 4.1.3 Identify and replicate two-dimensional designs that contain a line of symmetry.(Coordinate Geometry and Line of Symmetry)

Grades 2 - 2

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand Titles that Address the Substrand

(Gr. 2) 5.2.1 Collect, organize, record, and explain classification of data using concrete materials.(Data Collection and Organization)

Quarter Mile Math Level 1

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand Titles that Address the Substrand

(Gr. 2) 3.2.1 Compare and order objects by various measurable attributes (e.g., time, temperature, length, weight, capacity, volume, and area) communicating their similarities and differences.(Comparison and Ordering)

(Gr. 2) 3.2.2 Compare objects to standard whole units to find objects that are greater than, less than, and/or equal to a given unit (e.g., inch, yard, centimeter, meter).(Measurement)

(Gr. 2) 3.2.4 Determine the value of any given set of coins and bills.(Money)

Quarter Mile Math Level 1

(Gr. 2) 3.2.6 Recite and use the months of the year in order; use a calendar to identify days, weeks, months, and year; read time to the nearest quarter hour; distinguish between day and night, i.e., between A.M. and P.M.(Time)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand Titles that Address the Substrand

(Gr. 2) 1.2.1 Identify and model basic addition facts (sums to 18) and the corresponding subtraction facts; immediately recall basic addition facts (sums through 10) and the corresponding subtraction facts.(Facts)

Quarter Mile Math Level 1

(Gr. 2) 1.2.2 Add and subtract multi-digit numbers without regrouping.(Application)

Quarter Mile Math Level 1

(Gr. 2) 1.2.3 Generate and solve one-step addition and subtraction problems based on practical situations.(Word Problems and Number Theory)

Quarter Mile Math Level 1

(Gr. 2) 1.2.4 Use decimals to show money amounts.(Decimals)

(Gr. 2) 1.2.5 Use the inherent patterns in numbers to skip count by 2s, 3s, 5s, and 10s to 100 and beyond.(Computation)

Quarter Mile Math Level 1

(Gr. 2) 1.2.6 Read, write, order, and compare numbers from 0-999.(Comparison and Ordering)

Quarter Mile Math Level 1

(Gr. 2) 1.2.7 Estimate the number of objects in a set to 20; read and write number words to 20 and use ordinal positions first to twentieth.(Estimation and Rounding)

Quarter Mile Math Level 1

(Gr. 2) 1.2.8 Use, model, and identify place value positions of 1s, 10s, and 100s.(Place value)

Quarter Mile Math Level 1

(Gr. 2) 1.2.9 Identify, model, and label + and + as parts of a whole.(Fractions)

Quarter Mile Math Level 1

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand

Titles that Address the Substrand

(Gr. 2) 2.2.1 Recognize, describe, extend, and create repeating and increasing patterns using symbols, objects, and manipulatives; use patterns and their extensions to solve problems.(Patterns)

(Gr. 2) 2.2.3 Use variables and open sentences to express relationships.(Variables (Unknowns))

(Gr. 2) 2.2.4 Generate and solve problems based on various numerical sentences.(Number Sentences)

Quarter Mile Math Level 1

(Gr. 2) 2.2.7 Model, explain and solve a number sentence involving addition and subtraction.(Equation Solutions)

Quarter Mile Math Level 1

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand

Titles that Address the Substrand

(Gr. 2) 4.2.1 Identify, name, sort, sketch, describe, and compare two dimensional shapes (circles, triangles, rectangles including squares) regardless of position.(Two-Dimensional Shapes)

(Gr. 2) 4.2.2 Use position words (e.g., before, far, below, left) to describe location of objects and to place objects; compare the size (larger and smaller) of similar two-dimensional figures (e.g., circles, triangles); identify congruent shapes.(Transformations)

(Gr. 2) 4.2.3 Identify figures with symmetry as they appear in the environment; create two-dimensional designs that contain a line of symmetry.(Coordinate Geometry and Line of Symmetry)

(Gr. 2) 4.2.4 Identify, name, sort, describe, compare, and contrast two- and three- dimensional geometric figures (e.g., circle/sphere, square/cube, triangle/pyramid).(Two- and three-dimensional figures)

Grades 3 - 3

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand

Titles that Address the Substrand

(Gr. 3) 5.3.1 Collect, organize, display, and describe simple data using number lines, pictographs, bar graphs, and frequency tables.(Data Collection and Organization)

(Gr. 3) 5.3.2 Use concepts of probability (e.g., impossible, likely, certain) to make predictions about future events.(Probability)

Subject: MATH

Standard: Mathematical Communication

Strand: Students will develop their ability to communicate mathematically by solving problems in which there is a need to obtain information from the real world through reading, listening, and observing in order to: translate this information into a mathematical language and symbols; process this information mathematically; and present results in written, oral and visual formats.

Substrand Titles that Address the Substrand

(Gr. 3-5) 7.5 Identify and translate key words and phrases that imply mathematical operations.

Quarter Mile Math Level 1

Quarter Mile Math Level 2

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand Titles that Address the Substrand

(Gr. 3) 3.3.2 Measure and record to a required degree of accuracy and evaluate for error, identifying the appropriateness of selected units of measure.(Measurement)

(Gr. 3) 3.3.3 Estimate and use measuring devices with standard and non-standard units to measure length, surface area, liquid volume, capacity, temperature, and weight, communicating the concepts of more, less, and equivalent.(Estimation)

(Gr. 3) 3.3.4 Read, write, and use money notation determining possible combinations of coins and bills to equal given amounts.(Money)

Quarter Mile Math Level 1

(Gr. 3) 3.3.6 Tell time to the nearest minute, using analog and digital clocks, and identify elapsed time.(Time)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand Titles that Address the Substrand

(Gr. 3) 1.3.1 Immediately recall and use addition and subtraction facts and multiplication facts to 81.(Facts)

Quarter Mile Math Level 1

(Gr. 3) 1.3.2 Add and subtract multi-digit numbers with regrouping.(Application)

Quarter Mile Math Level 1

(Gr. 3) 1.3.3 Generate and solve 2-step addition and subtraction and 1-step multiplication problems based on practical situations using pencil and paper, mental computation, and estimation.(Word Problems and Number Theory)

Quarter Mile Math Level 1

(Gr. 3) 1.3.4 Add and subtract decimals using money as a model.(Decimals)

Quarter Mile Math Level 1

(Gr. 3) 1.3.5 Use addition to model and explain multiplication.(Computation)

Quarter Mile Math Level 1

(Gr. 3) 1.3.6 Read, write, order, and compare numbers from 0-9,999.(Comparison and Ordering)

Quarter Mile Math Level 1

(Gr. 3) 1.3.7 Round to nearest tens and hundreds to determine reasonableness of the answer.(Estimation and Rounding)

Quarter Mile Math Level 1

(Gr. 3) 1.3.8 Use, model, and identify place value positions up to 10,000.(Place value)

Quarter Mile Math Level 1

(Gr. 3) 1.3.9 Model, sketch, and label fractions with denominators to 10; write fractions with numerals and with number words.(Fractions)

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand

Titles that Address the Substrand

(Gr. 3) 2.3.1 Recognize, describe, and create repeating and increasing patterns using numbers; use number patterns and their extensions to solve problems.(Patterns)

(Gr. 3) 2.3.3 Identify missing terms and missing numbers in open number sentences involving number facts in addition and subtraction.(Variables (Unknowns))

Quarter Mile Math Level 1

(Gr. 3) 2.3.4 Complete number sentences with the appropriate words and symbols for addition, subtraction, less than, greater than, and equal to (+, - , <, >, =).(Number Sentences)

Quarter Mile Math Level 1

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand

Titles that Address the Substrand

(Gr. 3) 4.3.1 Describe, sketch, compare, and contrast plane geometric figures.(Two-Dimensional Shapes)

(Gr. 3) 4.3.2 Demonstrate and describe the motion (transformation) of geometric figures as a slide, rotation, or a flip.(Transformations)

(Gr. 3) 4.3.4 Describe, sketch, model, build, compare, and contrast two- and three-dimensional geometric figures.(Two- and three-dimensional figures)

Grades 4 - 4

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand Titles that Address the Substrand

(Gr. 4) 5.4.1 Collect, organize, display, describe, and interpret simple data using number lines, pictographs, bar graphs, and frequency tables.(Data Collection and Organization)

(Gr. 4) 5.4.2 Conduct simple probability experiments using concrete materials and represent the results using fractions.(Probability)

Quarter Mile Math Level 2

Subject: MATH

Standard: Mathematical Communication

Strand: Students will develop their ability to communicate mathematically by solving problems in which there is a need to obtain information from the real world through reading, listening, and observing in order to: translate this information into a mathematical language and symbols; process this information mathematically; and present results in written, oral and visual formats.

Substrand Titles that Address the Substrand

(Gr. 4-6) 7.8 Use physical material, diagrams, and tables to represent and then communicate mathematical ideas through oral, verbal, and written formats.

Quarter Mile Math Level 3

(Gr. 4-12) 7.13 Make conjectures and present arguments in discussions of mathematical ideas.

Subject: MATH

Standard: Mathematical Connections

Strand: Students will develop the ability to make mathematical connections by solving problems in which there is a need to view mathematics as an integrated whole, identifying relationships between context strands, and integrating mathematics with other disciplines, allowing the flexibility to approach problems in a variety of ways within and beyond the field of mathematics.

Substrand Titles that Address the Substrand

(Gr. 4-12) 9.3 Use models to explain the relationship of concepts to procedures.

Subject: MATH

Standard: Mathematical Reasoning

Strand: Student will develop their ability to reason mathematically by solving problems in which there is a need to investigate significant mathematical ideas and construct their own learning in all content areas in order to justify their thinking; reinforce and extend their logical reasoning abilities; reflect on and clarify their own thinking; and ask questions to extend their thinking.

Substrand **Titles that Address the Substrand**

(Gr. 4-12) 8.5 Follow a logical argument and judge its validity.

(Gr. 4-5) 8.6 Apply deductive and inductive reasoning in mathematical situations to extend logical reasoning.

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand **Titles that Address the Substrand**

(Gr. 4) 3.4.2 Measure and compare length in inches, feet, yards, and miles to the closest fractional part ($\frac{1}{4}$, $\frac{1}{2}$); convert within this system.(Measurement)

Quarter Mile Math Level 2

(Gr. 4) 3.4.4 Determine totals for monetary amounts in problem- solving situations.(Money)

(Gr. 4) 3.4.5 Describe and determine the perimeter of polygons and the area of rectangles (including squares).(Proportion and Ratio)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand **Titles that Address the Substrand**

(Gr. 4) 1.4.1 Immediately recall and use multiplication and corresponding division facts through the 12s.(Facts)

Quarter Mile Math Level 2

(Gr. 4) 1.4.3 Generate and solve 2-step multiplication and division problems based on practical situations using pencil and paper, mental computation, and estimation.(Word Problems and Number Theory)

Quarter Mile Math Level 2

(Gr. 4) 1.4.4 Multiply and divide money amounts by a one-digit whole number producing a solution with no remainder.(Decimals)

Quarter Mile Math Level 2

(Gr. 4) 1.4.5 Multiply multi-digit numbers by a one-digit number with regrouping. Use subtraction to model and explain division.(Computation)

Quarter Mile Math Level 2

(Gr. 4) 1.4.6 Read, write, order, and compare numbers from 0-999,999.(Comparison and Ordering)

Quarter Mile Math Level 2

(Gr. 4) 1.4.7 Round to the nearest tens, hundreds, or thousands to determine the reasonableness of the answer.(Estimation and Rounding)

Quarter Mile Math Level 2

(Gr. 4) 1.4.8 Use and identify place value positions up to 100,000.(Place value)

Quarter Mile Math Level 2

(Gr. 4) 1.4.9 Identify and compare fractions with like denominators using models and drawings.(Fractions)

Quarter Mile Math Level 2

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand Titles that Address the Substrand

(Gr. 4) 2.4.1 Identify, describe, and explain patterns and relationships including those formed by multiples, factors, and powers of 10 using paper and pencil.(Patterns)

(Gr. 4) 2.4.3 Find solutions to given equalities from a given replacement set, (e.g. find the solution to $3 \times 7 = \underline{\hspace{1cm}}$, given the replacement set (19, 20, 21).(Variables (Unknowns))

Subject: MATH

Standard: Problem Solving

Strand: Students will develop their ability to solve problems by engaging in developmentally appropriate problem solving opportunities in which there is a need to use various approaches to investigate and understand mathematical concepts in order to: formulate their own problems; find solutions to problems from everyday situations; develop and apply strategies to solve a wide variety of problems; and integrate mathematical reasoning, communication and connections.

Substrand Titles that Address the Substrand

(Gr. 4-12) 6.5 Verify, interpret, and evaluate results with respect to the original problem situation, determining an efficient strategy for the given situation.

(Gr. 4-12) 6.9 Generalize solutions and strategies from earlier problems to new problem situations.

(Gr. 4-12) 6.10 Interpret and solve a variety of mathematical problems by paraphrasing, identifying necessary and extraneous information, selecting and justifying efficient methods and/or strategies, and ensuring the answer is reasonable.

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand Titles that Address the Substrand

(Gr. 4) 4.4.1 Identify, draw, and classify angles according to their measurement, including right, obtuse, and acute.(Two-Dimensional Shapes)

(Gr. 4) 4.4.2 Use motion geometry including flips, turns, and slides to examine the concepts of similarity, congruence, and symmetry.(Transformations)

(Gr. 4) 4.4.4 Identify, describe, and classify two- and three- dimensional figures by relevant properties including the number of vertices (corners), edges, and shapes of faces.(Two- and three-dimensional figures)

(Gr. 4) 4.4.6 Identify, describe, and draw geometric figures including points, intersecting, parallel lines, line segments, rays, and angles.(Parallel Lines and Special Angles)

Grades 5 - 5

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand

Titles that Address the Substrand

(Gr. 5) 5.5.1 Collect, organize, read, and interpret data using a variety of graphic representations including tables, line plots, stem and leaf plots, scatter plots, histograms; use data to draw and explain conclusions and predictions.(Data Collection and Organization)

(Gr. 5) 5.5.2 Conduct simple probability experiments using concrete materials and represent the results using fractions.(Probability)

Quarter Mile Math Level 2

(Gr. 5) 5.5.3 Solve probability problems using a variety of methods including constructing sample spaces and tree diagrams.(Probability Analysis)

(Gr. 5) 5.5.4 Model and then compute measures of central tendency including mean, median, and mode.(Central Tendency)

(Gr. 5) 5.5.6 Describe the limitations of various graph formats; select an appropriate type of graph to accurately represent the data and justify the selection.(Design)

Subject: MATH

Standard: Mathematical Reasoning

Strand: Student will develop their ability to reason mathematically by solving problems in which there is a need to investigate significant mathematical ideas and construct their own learning in all content areas in order to justify their thinking; reinforce and extend their logical reasoning abilities; reflect on and clarify their own thinking; and ask questions to extend their thinking.

Substrand

Titles that Address the Substrand

(Gr. 5-7) 8.2 Justify answers and the steps taken to solve problems with and without manipulatives and physical models.

Subject: MATH

Quarter Mile Math Level 2

(Gr. 5) 1.5.9 Use models and drawings to identify, compare, add, and subtract fractions with like denominators and to add and subtract decimals; use both to solve problems.(Fractions)

Quarter Mile Math Level 2

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand Titles that Address the Substrand

(Gr. 5) 2.5.1 Identify, describe, and explain patterns and relationships in the number system (e.g., formed by triangular numbers, perfect squares, arithmetic and geometric sequences) using concrete materials, paper and pencil, and calculators.(Patterns)

(Gr. 5) 2.5.3 Using whole numbers as a replacement set, find possible solutions to such inequalities as $8 + 4 > n$.(Variables (Unknowns))

Quarter Mile Math Level 2

(Gr. 5) 2.5.4 Use variables in open sentences and to describe simple functions and relationships.(Number Sentences and Equations)

(Gr. 5) 2.5.7 Solve simple equations using a variety of methods (e.g. inverse operations, mental math, and estimate and verify).(Equation Solutions)

Quarter Mile Math Level 2

Subject: MATH

Standard: Problem Solving

Strand: Students will develop their ability to solve problems by engaging in developmentally appropriate problem solving opportunities in which there is a need to use various approaches to investigate and understand mathematical concepts in order to: formulate their own problems; find solutions to problems from everyday situations; develop and apply strategies to solve a wide variety of problems; and integrate mathematical reasoning, communication and connections.

Substrand Titles that Address the Substrand

(Gr. 5-12) 6.7 Apply multi-step, integrated, mathematical problem-solving strategies, persisting until a solution is found or until it is clear that no solution exists.

(Gr. 5-12) 6.13 Use technology, including calculators, to solve problems and verify solutions.

(Gr. 5-12) 6.14 Use technology, including calculators, to investigate, define, and describe quantitative relationships such as patterns and functions.

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand **Titles that Address the Substrand**

(Gr. 5) 4.5.1 Draw and classify angles and triangles according to their measurement (e.g., right, obtuse, and acute); identify and draw circles and parts of circles, describing the relationships between the various parts (e.g., central angle, arc, diameter).(Two-Dimensional Shapes)

(Gr. 5) 4.5.2 Identify shapes that have congruence, similarity, and/or symmetry of figures using a variety of methods including transformational motions (e.g., translation/slide, rotation/turn, reflection/flip, enlargement/reduction) and models, drawings, and measurement tools.(Transformations)

(Gr. 5) 4.5.3 Using a grid, identify coordinates for a given point or locate points of given coordinates in the first quadrant.(Coordinate Geometry and Line of Symmetry)

(Gr. 5) 4.5.4 Identify, describe, compare, and classify two and three- dimensional figures by relevant properties including number of vertices (corners), edges, and shapes of faces; identify and predict the effects of combining, dividing, and changing shapes into other shapes.(Two- and three-dimensional figures)

(Gr. 5) 4.5.6 Identify, describe, define, and draw geometric figures including points, intersecting, perpendicular and parallel lines, line segments, rays, angles, and planes.(Lines, Angles, and Geometric Figures)

Grades 6 - 6

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand **Titles that Address the Substrand**

(Gr. 6) 5.6.1 Collect, organize, read, and interpret data using circle graphs; use data to draw and explain conclusions and predictions.(Data Collection and Organization)

(Gr. 6) 5.6.2 Conduct simple probability experiments using concrete materials and represent the results using decimals and percents ($1/10$, $1/4$, $1/2$) and their respective equivalents.(Probability)

Quarter Mile Math Level 2

(Gr. 6) 5.6.5 Analyze the effect a change of format will have on interpretation of statistical charts and graphs.(Data Analysis)

Quarter Mile Math Level 3

Subject: MATH

Standard: Mathematical Communication

Strand: Students will develop their ability to communicate mathematically by solving problems in which there is a need to obtain information from the real world through reading, listening, and observing in order to: translate this information into a mathematical language and symbols; process this information mathematically; and present results in written, oral and visual formats.

Substrand **Titles that Address the Substrand**

(Gr. 6-12) 7.3 Read expository text to learn about mathematics.

(Gr. 6-12) 7.6 Interpret and solve word problems without the necessity of key words or phrases.

(Gr. 6-12) 7.11 Explain and evaluate thinking about mathematical ideas and solutions.

(Gr. 6-12) 7.12 Evaluate the effectiveness of written and oral presentations of mathematics.

(Gr. 6-7) 7.14 Explain and evaluate thinking about mathematical ideas and solutions.

Subject: MATH

Standard: Mathematical Connections

Strand: Students will develop the ability to make mathematical connections by solving problems in which there is a need to view mathematics as an integrated whole, identifying relationships between context strands, and integrating mathematics with other disciplines, allowing the flexibility to approach problems in a variety of ways within and beyond the field of mathematics.

Substrand **Titles that Address the Substrand**

(Gr. 6-12) 9.4 Use the connections among mathematical topics to develop multiple approaches to problems.

Subject: MATH

Standard: Mathematical Reasoning

Strand: Student will develop their ability to reason mathematically by solving problems in which there is a need to investigate significant mathematical ideas and construct their own learning in all content areas in order to justify their thinking; reinforce and extend their logical reasoning abilities; reflect on and clarify their own thinking; and ask questions to extend their thinking.

Substrand **Titles that Address the Substrand**

(Gr. 6-12) 8.7 Recognize and apply deductive and inductive reasoning in both concrete and abstract contexts.

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand **Titles that Address the Substrand**

(Gr. 6) 3.6.1 Compare and convert units of measure for length, weight, and liquid and dry measure, within the same measurement system (customary or metric).(Comparison and Ordering)

(Gr. 6) 3.6.2 Explain how the size of the unit used affects the precision; given two measurements of the same object, select the one that is more precise.(Measurement)

(Gr. 6) 3.6.3 Estimate, measure to the required degree of accuracy, derive, and apply formulas to find the perimeter, circumference, and area of plane figures.(Estimation)

(Gr. 6) 3.6.5 Use ratios to describe and compare relationships between various objects.(Proportion and Ratio)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number

relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand	Titles that Address the Substrand
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(Gr. 6) 1.6.1 Read, write, add, subtract, multiply, and divide with decimals, fractions, and percents.(Facts)
Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 6) 1.6.2 Apply decimals, fractions, and percents to solve mathematical and practical problems.(Application)
Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 6) 1.6.3 Use concepts of number theory including prime and composite numbers, factors, multiples, rules of divisibility.(Word Problems and Number Theory)

(Gr. 6) 1.6.6 Compare and order groups of fractions and groups of decimals (e.g., on a number line).(Comparison and Ordering)
Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 6) 1.6.7 Round to a given decimal place value; estimate using decimals, fractions, and percents.(Estimation and Rounding)
Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 6) 1.6.9 Use models and drawings to identify, compare, add, and subtract fractions with unlike denominators; translate between fractions, decimals, and percents.(Fractions)
Quarter Mile Math Level 2
Quarter Mile Math Level 3

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand	Titles that Address the Substrand
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(Gr. 6) 2.6.1 Use and create tables and charts to identify, describe, and extend a pattern.(Patterns)
Quarter Mile Math Level 3

(Gr. 6) 2.6.2 Identify, model, describe, and evaluate relationships using charts and tables, with and without technology.(Relationships)

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand	Titles that Address the Substrand
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(Gr. 6) 4.6.1 Measure angles; identify, describe by properties, classify, compare, and draw regular and irregular quadrilaterals; find the sum of the interior angles of triangles and quadrilaterals.(Two-Dimensional Shapes)

(Gr. 6) 4.6.2 Translate map distances and scale drawing measurements to actual measures.(Transformations)

(Gr. 6) 4.6.3 Using a coordinate grid, identify coordinates for a given point and locate points of given coordinates; plot geometric shapes in all four quadrants.(Coordinate Geometry and Line of Symmetry)

(Gr. 6) 4.6.4 Make a model of a three dimensional prism from a two-dimensional drawing and make a two-dimensional drawing of a three-dimensional prism.(Two- and three-dimensional figures)

(Gr. 6) 4.6.5 Model slope (pitch, angle of inclination) using concrete objects and practical examples.(Line Slopes and Linear Equations)

(Gr. 6) 4.6.6 Draw complementary and supplementary angles; identify and find measures of complementary and supplementary angles using arithmetic and geometric methods.(Lines, Angles, and Geometric Figures)

(Gr. 6) 4.6.7 Determine the measures of missing angles of triangles based on the Triangle Sum Theorem (the sum of the interior angles of a triangle equals 180 degrees).(Pythagorean Theorem)

(Gr. 6) 4.6.8 Construct circles, angles, and triangles based on given measurements using a variety of methods (e.g., protractor, paper folding).(Draw and Construct)

Grades 7 - 7

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand

Titles that Address the Substrand

(Gr. 7) 5.7.1 Organize, display, read, and analyze data with and without technology using a variety of displays including frequency distributions and circle graphs.(Data Collection and Organization)

(Gr. 7) 5.7.2 Find the theoretical probability (the mathematical expectations) of an event using different counting methods (e.g., tree diagrams, sample space, organized lists) and compare those results with actual (experimental) results.(Probability)

(Gr. 7) 5.7.3 Find the number of combinations possible in given situations using a variety of counting methods.(Probability Analysis)

(Gr. 7) 5.7.4 Select, use, and graph (when possible) measures of variability including range, distribution and possible outliers.(Central Tendency)

(Gr. 7) 5.7.6 Given a set of data, interpolate and extrapolate to make and explain predictions.(Design)

Subject: MATH

Standard: Mathematical Communication

Strand: Students will develop their ability to communicate mathematically by solving problems in which there is a need to obtain information from the real world through reading, listening, and observing in order to: translate this information into a mathematical language and symbols; process this information mathematically; and present results in written, oral and visual formats.

Substrand **Titles that Address the Substrand**

(Gr. 7-12) 7.9 Model and explain mathematical relationships using oral, written, graphical, and algebraic methods.
Quarter Mile Math Level 3

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand **Titles that Address the Substrand**

(Gr. 7) 3.7.1 Compare and convert units of measure of capacity, mass, and volume within the same measurement system; estimate conversions between like units of the two systems.(Comparison and Ordering)

(Gr. 7) 3.7.2 Given a measurement, determine the greatest possible error.(Measurement)

(Gr. 7) 3.7.3 Estimate, measure to the required degree of accuracy, derive, and apply standard formulas to find the volume and surface area of solid figures (e.g., cylinders, triangular solids).(Estimation)

(Gr. 7) 3.7.5 Given various situations, set up and solve proportions.(Proportion and Ratio)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand **Titles that Address the Substrand**

(Gr. 7) 1.7.1 Read, write, and compute ratios and proportions; read, write, add, subtract, multiply, and divide positive and negative numbers.(Facts)

Quarter Mile Math Level 3

(Gr. 7) 1.7.2 Apply ratios, proportions, and negative and positive numbers to solve mathematical and practical problems.(Application)

Quarter Mile Math Level 3

(Gr. 7) 1.7.3 Use absolute value and the value properties of real numbers including distributive, commutative, and associative to solve problems.(Word Problems and Number Theory)

Quarter Mile Math Level 3

(Gr. 7) 1.7.6 Compare and order groups containing a mix of fractions, percents, and decimals (e.g., on a number line).(Comparison and Ordering)

Quarter Mile Math Level 3

(Gr. 7) 1.7.7 Select and round to the appropriate significant digit; estimate using a variety of methods.(Estimation and Rounding)

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand Titles that Address the Substrand

(Gr. 7) 2.7.1 Use and create various coordinate plane graphs including linear, geometric, and exponential forms to identify, describe, and extend patterns and relationships, with and without calculators.(Patterns)

(Gr. 7) 2.7.2 Identify, model, describe, and evaluate relationships using graphs, with and without technology.(Relationships)

(Gr. 7) 2.7.3 Find the value of algebraic expressions using substitutions.(Variables (Unknowns))

Quarter Mile Math Level 3

(Gr. 7) 2.7.6 Model, identify, and solve linear equations and inequalities using concrete and informal methods and relate this process to the order operations.(Linear Equations)

(Gr. 7) 2.7.7 Given a rule, create a table and represent the ordered pairs on a coordinate grid.(Equation Solutions)

Quarter Mile Math Level 3

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand Titles that Address the Substrand

(Gr. 7) 4.7.1 Identify, describe by properties, classify, compare, and draw regular and irregular polygons such as pentagons, hexagons, octagons, and find the sum of the interior angles.(Two-Dimensional Shapes)

(Gr. 7) 4.7.2 Use ratio and proportions to create scale drawings from actual measurements.(Transformations)

(Gr. 7) 4.7.3 Use coordinate geometry and models to demonstrate geometric transformations including rotate/turn, translate/slide, reflect/flip by finding the ordered pairs that describe the location of the original and the transformed figures.(Coordinate Geometry and Line of Symmetry)

(Gr. 7) 4.7.4 Make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional drawing of a three dimensional object (e.g., pyramids, cylinders, cones, spheres).(Two- and three-dimensional figures)

(Gr. 7) 4.7.5 Use coordinate geometry to represent slope, midpoint, and horizontal and vertical distance.(Line Slopes and Linear Equations)

(Gr. 7) 4.7.6 Describe the properties of geometric relationships including parallel lines, perpendicular lines, bisectors, triangles, and quadrilaterals (e.g., properties of angles formed by a transversal of parallel lines).(Lines, Angles, and Geometric Figures)

(Gr. 7) 4.7.7 Model the Pythagorean Theorem; solve for the hypotenuse using the theorem.(Pythagorean Theorem)

(Gr. 7) 4.7.8 Construct and verify congruent angles, and parallel and perpendicular lines using hand tools.(Draw and Construct)

Grades 8 - 8

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand Titles that Address the Substrand

(Gr. 8) 5.8.1 Organize, display, read, and analyze data with and without technology using a variety of displays including circle graphs, frequency distributions, and box and whisker plots.(Data Collection and Organization)

Quarter Mile Math Level 3

(Gr. 8) 5.8.2 Find the theoretical probability (the mathematical expectations) of an event using different counting methods (e.g., tree diagrams, sample space, organized lists) and compare those results with actual (experimental) results, differentiating between the probability of an event and the odds of an event.(Probability)

(Gr. 8) 5.8.3 Find the number of combinations possible in given situations using a variety of counting methods.(Probability Analysis)

(Gr. 8) 5.8.5 Evaluate arguments that are based on data analysis for accuracy and validity; analyze the effect a change of scale or a change of format will have on statistical charts and graphs.(Data Analysis)

(Gr. 8) 5.8.6 Formulate accurate inferences and projections based on interpolations (filling in) and extrapolations (extending) of data to solve problems.(Design)

Subject: MATH

Standard: Mathematical Communication

Strand: Students will develop their ability to communicate mathematically by solving problems in which there is a need to obtain information from the real world through reading, listening, and observing in order to: translate this information into a mathematical language and symbols; process this information mathematically; and present results in written, oral and visual formats.

Substrand Titles that Address the Substrand

(Gr. 8-12) 7.15 Explain and evaluate thinking about mathematical ideas and solutions based on the role of definitions, properties, common rules, and symbols in solving problems.

Subject: MATH

Standard: Mathematical Connections

Strand: Students will develop the ability to make mathematical connections by solving problems in which there is a need to view mathematics as an integrated whole, identifying relationships between context strands, and integrating mathematics with other disciplines, allowing the flexibility to approach problems in a variety of ways within and beyond the field of mathematics.

Substrand Titles that Address the Substrand

(Gr. 8-12) 9.7 Use and analyze the connections between Mathematics and other disciplines.

Subject: MATH

Standard: Mathematical Reasoning

Strand: Student will develop their ability to reason mathematically by solving problems in which there is a need to investigate significant mathematical ideas and construct their own learning in all content areas in order to justify their thinking; reinforce and extend their logical reasoning abilities; reflect on and clarify their own thinking; and ask questions to extend their thinking.

Substrand Titles that Address the Substrand

(Gr. 8-12) 8.3 Construct, justify, and defend mathematical conclusions using logical arguments, in situations related to mathematics, science, and technology.

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand Titles that Address the Substrand

(Gr. 8) 3.8.1 Compare and convert units of measure for length, weight / mass, and volume within the same measurement system (customary and metric); estimate conversions between like units of the two systems to solve problems.(Comparison and Ordering)

(Gr. 8) 3.8.2 Demonstrate an understanding of precision, error and tolerance in measurement using the appropriate measurement tool to the required degree of accuracy.(Measurement)

(Gr. 8) 3.8.3 Estimate, measure to the required degree of accuracy, derive, and apply formulas to find perimeter, circumference and area of plane figures and volume and surface area of solid figures; identify the relationship between changes in area and volume and changes in linear measures of figures.(Estimation)

(Gr. 8) 3.8.5 Apply ratios and proportions to calculate rates and as a method of indirect measure (e.g., miles per hour, cost per unit).(Proportion and Ratio)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand Titles that Address the Substrand

(Gr. 8) 1.8.1 Read, write, add, subtract, multiply, and divide real numbers in various forms including radicals, exponential, and scientific notation.(Facts)

Quarter Mile Math Level 3

(Gr. 8) 1.8.2 Compute with rational and irrational numbers to solve a variety of problems including rates, recipes, unit cost, and percents (e.g., discounts, interest, sale price, commissions, taxes).(Application)

(Gr. 8) 1.8.3 Explain and apply concepts of number theory and properties of real numbers to solve problems.(Word Problems and Number Theory)

(Gr. 8) 1.8.7 Estimate in problem-solving situations and in practical applications; determine the reasonableness of the answer and verify the results.(Estimation and Rounding)

Quarter Mile Math Level 3

(Gr. 8) 1.8.9 Explain the relationship between fractions, decimals, and percents and translate among various representations of equal numbers (e.g., from fractions to decimals to percents, various forms of '1' such as $\frac{3}{3}$ or $\frac{16}{16}$) to solve problems efficiently.(Fractions)

Quarter Mile Math Level 3

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand

Titles that Address the Substrand

(Gr. 8) 2.8.1 Use inductive reasoning to find the missing term in number and geometric patterns and to generalize basic patterns to the n th term, with and without calculators; use written, oral, and symbolic language to identify and describe patterns, sequences, and functions.(Patterns)

Quarter Mile Math Level 3

(Gr. 8) 2.8.2 Identify, model, describe, and evaluate relationships including functions using diagrams and equations, with and without technology.(Relationships)

(Gr. 8) 2.8.3 Evaluate formulas and algebraic expressions for given values of a variable (e.g., $A = lw$ given $l = 6$, $w = 2$, then $A = 12$). (Variables (Unknowns))

Quarter Mile Math Level 3

(Gr. 8) 2.8.4 Add and subtract binomials describing the connection between the algebraic process and the arithmetic process.(Number Sentences and Equations)

Quarter Mile Math Level 3

(Gr. 8) 2.8.6 Model, identify, and solve linear equations and inequalities, using formal and informal methods, and relate this process to the order of operations.(Linear Equations)

(Gr. 8) 2.8.7 Solve simple linear equations and connect that process to the order of operations.(Equation Solutions)

Quarter Mile Math Level 3

Subject: MATH

Standard: Problem Solving

Strand: Students will develop their ability to solve problems by engaging in developmentally appropriate problem solving opportunities in which there is a need to use various approaches to investigate and understand mathematical concepts in order to: formulate their own problems; find solutions to problems from everyday situations; develop and apply strategies to solve a wide variety of problems; and integrate mathematical reasoning, communication and connections.

Substrand

Titles that Address the Substrand

(Gr. 8-12) 6.11 Apply combinations of proven strategies and previous knowledge to solve non-routine problems.

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand Titles that Address the Substrand

(Gr. 8) 4.8.1 Identify, classify, compare, and draw regular and irregular polygons such as triangles, quadrilaterals, pentagons, hexagons, and octagons; find the sum of the interior angles of polygons.(Two-Dimensional Shapes)

(Gr. 8) 4.8.2 Apply the properties of equality and proportionality to solve problems involving congruent or similar shapes (e.g., create scale drawings, perspective drawings).(Transformations)

(Gr. 8) 4.8.3 Use coordinate geometry and models to change scale (enlarge and reduce); demonstrate other geometric transformations by finding the ordered pairs and describe the location of the original and the transformed figures.(Coordinate Geometry and Line of Symmetry)

(Gr. 8) 4.8.4 Make a model of a three-dimensional figure from a two-dimensional drawing and make a two-dimensional drawing of a three-dimensional object.(Two- and three-dimensional figures)

(Gr. 8) 4.8.5 Use coordinate geometry to represent and interpret relationships defined by equations and formulas (including distance, midpoint, and slope) with and without technology.(Line Slopes and Linear Equations)

(Gr. 8) 4.8.6 Form generalizations and validate conclusions about properties of geometric shapes including parallel lines, perpendicular lines, bisectors, triangles, and quadrilaterals.(Lines, Angles, and Geometric Figures)

(Gr. 8) 4.8.7 Verify and explain the Pythagorean Theorem with various methods (e.g., using grid paper, applying it to a missing side of a right triangle); determine missing sides and angles of triangles based on properties of their sides and angles including the Triangle Sum Theorem.(Pythagorean Theorem)

(Gr. 8) 4.8.8 Use hand tools, technology, and models to construct figures and bisect angles and line segments; distinguish among constructions, sketches and drawings(Draw and Construct)

Grades 9 - 12

Subject: MATH

Standard: Data Analysis

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will collect, organize, display, interpret, and analyze data to determine statistical relationships and probability projections.

Substrand Titles that Address the Substrand

(Gr. 9-12) 5.12.1 Use calculators and computers to create and manipulate tables, graphs, and matrices to communicate statistical information; use the shape of graphs of normal distributions to compare and analyze information.(Data Collection and Organization)

(Gr. 9-12) 5.12.2 Design, conduct, analyze, and communicate the results of multi-stage probability experiments.(Probability)

(Gr. 9-12) 5.12.3 Identify a probability situation as a permutation or a combination and find the possible outcomes using a variety of methods.(Probability Analysis)

(Gr. 9-12) 5.12.4 Select and use the measures of central tendency such as mean, median, mode and variability including range, distribution and possible outliers that are appropriate for given situations.(Central Tendency)

(Gr. 9-12) 5.12.5 Analyze the validity of statistical conclusions noting various sources of bias, misuse, and abuse of data caused by a wide variety of factors including choices of scale, probability versus odds, inappropriate uses of measures of central tendency, inaccurate curve fitting and inappropriate uses of controls or sample groups.(Data Analysis)

(Gr. 9-12) 5.12.6 Design, construct, analyze, and select an appropriate type of graph to represent data to communicate the results of statistical experiments (e.g., write a survey question and analyze and communicate the findings).(Design)

Subject: MATH

Standard: Measurement

Strand: To solve problems, communicate, reason and make connections within and beyond the field of mathematics, students will use appropriate tools and techniques of measurement to determine, estimate, record, and verify direct and indirect measurements.

Substrand Titles that Address the Substrand

(Gr. 9-12) 3.12.1 Convert one unit of measure to another between customary and metric systems and between monetary systems.(Comparison and Ordering)

(Gr. 9-12) 3.12.2 Select and use measurement tools, techniques, and formulas to calculate and compare rates, cost, distances, interest, temperatures, and weight/mass.(Measuremen)

(Gr. 9-12) 3.12.3 Distinguish and differentiate among the structures, language and uses of systems of measures (e.g., linear, square units, cubic units); justify and communicate the differences between accuracy, precision, error, and tolerance in measurement; describe how each of these can affect solutions found in problem situations.(Estimation)

(Gr. 9-12) 3.12.4 Use and interpret consumer data (e.g., amortization tables, tax tables, and compound interest charts) to make informed financial decisions related to practical applications such as budget.(Money)

(Gr. 9-12) 3.12.5 Use relationships (e.g., proportions) and formulas (indirect measurement) to determine the measurement of unknown dimensions, angles, areas, and volumes to solve problems.(Proportion and Ratio)

Subject: MATH

Standard: Numbers, Number Sense, And Computation

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will accurately calculate and use estimation techniques, number relationships, operation rules, and algorithms; they will determine the reasonableness of answers and the accuracy of solutions.

Substrand Titles that Address the Substrand

(Gr. 9-12) 1.12.1 Calculate and estimate sums, differences, products, quotients, powers, and roots using mental math, formulas, and algorithms.(Facts)

Quarter Mile Math Level 3

(Gr. 9-12) 1.12.2 Apply the laws of exponents to perform operations on expressions with integral exponents and scientific notation.(Application)

Quarter Mile Math Level 3

(Gr. 9-12) 1.12.3 Apply properties and theories of the real number system to everyday situations.(Word Problems and Number Theory)

Quarter Mile Math Level 3

(Gr. 9-12) 1.12.5 Perform simple operations on matrices.(Computation)

Quarter Mile Math Level 3

Subject: MATH

Standard: Patterns, Functions, And Algebra

Strand: To solve problems, communicate, reason, and make connections within and beyond the field of mathematics, students will use various algebraic methods to analyze, illustrate, extend, and create numerous representations (words, numbers, tables, and graphs) of patterns, functions, and algebraic relations as modeled in practical situations.

Substrand Titles that Address the Substrand

(Gr. 9-12) 2.12.2 Represent, analyze, and solve problem situations using discrete structures including graphs and matrices, with and without technology.(Relationships)

(Gr. 9-12) 2.12.3 Create and use different forms of a variety of equations, proportions, and/or formulas ($I=PRT$ or $R=I/PT$), solving for the needed variable as necessary in given situations.(Variables (Unknowns))

Quarter Mile Math Level 3

(Gr. 9-12) 2.12.4 Add, subtract, multiply, and factor (1st and 2nd degree) polynomials, describing each step in the process and the connection between the algebraic process and the arithmetic process; use simple quadratic equations with integer roots to solve practical and mathematical problems.(Number Sentences and Equations)

Quarter Mile Math Level 3

(Gr. 9-12) 2.12.6 Determine the domain and range of linear relations given a graph or a set of ordered pairs; explain their importance in problem solving situations.(Linear Equations)

(Gr. 9-12) 2.12.7 Solve systems of two linear equations both algebraically and graphically; use graphing calculators as a primary tool in solving these problems and to verify solutions found by other methods.(Equation Solutions)

Subject: MATH

Standard: Spatial Relationships And Geometry

Strand: To solve problems, communicate, and make connections within and beyond the field of mathematics, students will identify, represent, verify, and apply spatial relationships and geometric properties.

Substrand Titles that Address the Substrand

(Gr. 9-12) 4.12.1 Identify and use the properties of polygons (including interior and exterior angles) and elements of circles (e.g., angles, arc, chord, secants and tangents) to solve practical problems.(Two-Dimensional Shapes)

(Gr. 9-12) 4.12.5 Use coordinate geometry to graph linear equations, determine slopes of lines, identify parallel and perpendicular lines and find possible solutions to sets of equations; use algebraic techniques to solve problems determined by geometric relationships.(Line Slopes and Linear Equations)

(Gr. 9-12) 4.12.6 Use complementary and supplementary angles, congruent angles, vertical angles, angles formed when parallel lines are cut by a transversal, and angles in polygons to solve practical problems(Lines, Angles, and Geometric Figures)

(Gr. 9-12) 4.12.7 Apply the Pythagorean Theorem, its converse, properties of special right triangles, and right triangle trigonometry to solve practical problems.(Pythagorean Theorem)

(Gr. 9-12) 4.12.8 Use tools, technology, and models to sketch, draw, and construct geometric figures in order to solve problems and to demonstrate the properties of geometric figures.(Draw and Construct)

(Gr. 9-12) 4.12.9 Construct, justify and defend mathematical conclusions using logical, sequential, deductive reasoning supported by established mathematical principles.(Logic and Deductive Reasoning)