THE QUARTER MILE MATH

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

Grades K - 12
Subject: MATH
Standard: Data Analysis And Probability
Strand: Functional

Substrand	Titles that Address the Substrand

(Gr. K-12) 2M-FS 3. Use number skills to solve a variety of real-world problems. PO 1. Use counting skills to solve problems (e.g., count number of chairs at table and get enough place settings/napkins). PO 2. Follow directions with ordinal numbers (e.g., meet you on the 4th floor, get off at the second bus stop, go to the third door on the right). PO 3. Determine how many more/less are needed (e.g., washing machine requires 6 quarters for wash cycleStudent has 2 quarters, how many more are needed? Student has 8 quarters, how many will be left after putting 6 quarters in the washing machine?) PO 4. Use computation skills to solve problems (e.g., check book balances, using a calculator, compute costs of purchases when shopping). PO 5. Follow ...

Quarter Mile Math Level 1
Quarter Mile Math Level 2
Quarter Mile Math Level 3

Subject: MATH
Standard: Number Sense
Strand: Functional

Substrand	Titles that Address the Substrand

(Gr. K-12) 1M-FS1. Develop an understanding of number meanings and relationships. PO 1. Demonstrate number concepts 1,2, and 3 (e.g., pick one from a choice of two, hand out two milks to each child at lunch, use two plastic bags when bagging bottled grocery items). PO 2. Demonstrate concept of 'more', 'one more'. PO 3. Communicate age (e.g., showing number of fingers to represent age, state age, show identification card which communicates age/date of birth). PO 4. Read written numerals, 0-9. PO 5. Demonstrate concept of 'none'.

Quarter Mile Math Level 1
Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. K-12) 1M-FS2. Demonstrate one-to-one correspondence between elements in collections (sets) (e.g., nine blocks is as many as nine ducks) PO 1. Match groups having equal numbers of objects up to 10. PO 2. Using a model of sets up to 10, complete partial sets (e.g., determine how many more or less are needed). PO 3. Distribute or indicate distribution of items into equal sets. (e.g., one milk carton/student, pass out one pencil or workbook to each student at beginning of class, one place setting/person, divide cards for any number of players.)

Quarter Mile Math Level 1

(Gr. K-12) 1M-FS4. Identify and use money (bills/coins) in real world situations. PO 1. Match coins to purchase an item (e.g., use cue card with visual or tactile representation of coins when using vending machines). PO 2. Count out requested number of dollar bills up to 10 with an example (e.g., number line). PO 3. Identify amount of purchase (e.g., by looking at register, listening to clerk or asking 'How much do I owe?'). PO 4. Given a purchase price, student determines if s/he has a sufficient amount of money to pay for the item with or without a visual/tactile strategy (e.g., given a specified

amount of money, use a number line, next dollar, or the calculator strategy and newspaper sales ads to determine whether there is enough money for a ...

Quarter Mile Math Level 2

Subject: MATH
Standard: Number Sense
Strand: Readiness

Substrand **Titles that Address the Substrand**

(Gr. K) 1M-R1.Develop an understanding of number meanings and relationships

Quarter Mile Math Level 1

(Gr. K) 1M-R2.Demonstrate one-to-one correspondence between elements in collections (sets) (e.g., nine blocks is as many as nine ducks)

Quarter Mile Math Level 1

(Gr. K) 1M-R4.Recognize relationships between concrete representations, number names, and symbolic representations of numbers (e.g., understand that three rocks can be represented as three circles, the numeral 3 and the word three)

Quarter Mile Math Level 1

Subject: MATH
Standard: Mathematical Structure/logic
Strand: Foundations

Substrand **Titles that Address the Substrand**

(Gr. 1-3) 6M-F1.Recognize that numbers are used for different purposes in the world and a variety of mathematical notations represent these situations PO 1. Formulate mathematical problems from everyday situations

Quarter Mile Math Level 1

Subject: MATH
Standard: Number Sense
Strand: Foundations

Substrand **Titles that Address the Substrand**

(Gr. 1-3) 1M-F1.Represent and use numbers in equivalent forms through the use of physical models, drawings, word names and symbols (e.g., using concrete materials and fraction equivalents to represent and compare halves, thirds, fourths, eighths and tenths) PO 1. Make a model to represent a given whole number PO 2. Identify a whole number represented by a model with a word name and symbol PO 3. Construct equivalent forms of whole numbers (e.g., 15 + 5 = 10 + 10) PO 4. Make a model to represent a given fraction (e.g., geometric modelshading a picture, set modelpart of an egg carton) (halves, thirds and fourths) PO 5. Identify the fraction represented by a model with a word name and symbol (halves, thirds and fourths) PO 6. Identify a given model ...

Quarter Mile Math Level 1
Quarter Mile Math Level 2

(Gr. 1-3) 1M-F2.Relate counting, grouping and place-value concepts to whole numbers (e.g., reading and writing the number represented when objects are grouped by thousands, hundreds, tens and ones) PO 1. Read whole numbers up to one thousand PO 2. Write whole numbers up to one thousand PO 3. Order whole numbers (e.g., smallest to largest, largest to smallest) up to one thousand PO 4. Construct a model to represent place value concepts PO 5. Write a whole number in expanded notation (e.g., 531 = 500 + 30 + 1) PO 6. Read aloud a whole number with correct place value words (e.g., a student will read 5 2 1 as 'five hundred twenty-one') PO 7. Count money to $5.00 using bills and coins

Quarter Mile Math Level 1

(Gr. 1-3) 1M-F3.Understand the meaning for and application of the operations of addition, subtraction, multiplication and division PO 1. Demonstrate with models to show the process used in addition (joins things together, increases) PO 2. Demonstrate with models to show the process used in subtraction (takes away, compares, finds the difference, decreases) PO 3. Demonstrate with models to show the process used in multiplication (uses repeated addition, counts by multiples, combines things that come in groups of equal size, makes arrays, uses area models) PO 4. Demonstrate with models to show the process used in division (puts things into groups of equal size, shares equally, uses repeated subtraction) PO 5. Demonstrate with models the ...

Quarter Mile Math Level 1
Quarter Mile Math Level 2

(Gr. 1-3) 1M-F4.Demonstrate proficiency with the operations of addition and subtraction of whole numbers Note: Proficiencyaccurate and consistent solving of computational problems in a reasonable time, using self-checking skills PO 1. Demonstrate proficiency with basic facts up to 20 PO 2. Add and subtract two three-digit whole numbers PO 3. Solve problems using a variety of mental computations and estimation

Quarter Mile Math Level 1

(Gr. 1-3) 1M-F5.Demonstrate proficiency with the operations of multiplication and division of single-digit numbers PO 1. Demonstrate proficiency with basic facts up to the fives PO 2. Solve problems using a variety of mental computations and estimation

Quarter Mile Math Level 1
Quarter Mile Math Level 2

(Gr. 1-3) 1M-F6.Add and subtract commonly used fractions and decimals PO 1. Demonstrate with models addition and subtraction of fractions with common denominators (halves, thirds and fourths) PO 2. Add and subtract money up to $5.00

Quarter Mile Math Level 1
Quarter Mile Math Level 2

(Gr. 1-3) 1M-F7.Select and use appropriate techniques to facilitate computation (e.g., mental, estimation, paper-and-pencil, calculator and computer methods) while solving problems and determining the reasonableness of results PO 1. Select a computational technique to solve a problem PO 2. Solve a problem using the appropriate computational techniques PO 3. Evaluate the reasonableness of results using a variety of mental computation and estimation techniques (e.g., compatible numbers, front-end, chunking) PO 4. Use technology (e.g., calculators, computers, multimedia) to solve problems containing larger numbers

Quarter Mile Math Level 1
Quarter Mile Math Level 2

Subject: MATH
Standard: Patterns, Algebra And Functions
Strand: Foundations

Substrand **Titles that Address the Substrand**

(Gr. 1-3) 3M-F4.Represent and describe mathematical relationships such as order, grouping, etc. (e.g., given a string of numbers, describe the pattern, define the relationship between the numbers and determine the next number in line) PO 1. Identify the pattern in skip counting PO 2. Determine the next number in a skip counting pattern

Quarter Mile Math Level 1

(Gr. 1-3) 3M-F5.Recognize the symbols of equality and inequality PO 1. Use the symbols <, >, = to compare whole numbers

Quarter Mile Math Level 1

(Gr. 1-3) 3M-F6.Find missing elements in number sentences PO 1. Find the missing number in addition and subtraction number sentences

Quarter Mile Math Level 1

Subject: MATH
Standard: Measurement And Discrete Mathematics
Strand: Essentials

Substrand	Titles that Address the Substrand
(Gr. 4-8) 5M-E2.Select and use appropriate units and tools to measure to the degree of accuracy required in a particular problem-solving situation PO 1. State the appropriate tool to measure in a particular situation (e.g., 'What tool would you use to measure the top of your desk?') (Grades 4-5) PO 2. State the appropriate unit of measurement in a particular situation (e.g., 'What unit of measurement would you use to measure the top of your desk?' (Grades 4-5) PO 3. Measure to the appropriate degree of accuracy to solve problems (e.g., measuring to the nearest sixteenth of an inch or using ounces, measuring to the nearest millimeter or using liters) (Grades 4-5, 6-8)	**Quarter Mile Math Level 2**

Subject: MATH
Standard: Number Sense
Strand: Essentials

Substrand	Titles that Address the Substrand
(Gr. 4-8) 1M-E1.Read, write and order integers, whole numbers and rational numbers PO 1. Compare and order using concrete or illustrated models 1. whole numbers (to millions) (Grades 4-5) 2. common fractions (halves, thirds, fourths, eighths) (Grades 4-5) 3. decimals (thousandths) (Grades 4-5) 4. rational numbers (e.g., -5, 1.2, 1 3/4, square root of 16) (Grades 6-8) PO 2. Represent place value using concrete or illustrated models 1. whole numbers (millions), decimals (thousandths) (Grades 4-5) 2. rational numbers (millions to millionths) (Grades 6-8) PO 3. Read and write whole numbers, integers, common fractions and decimals using real-world situations 1. whole number (millions), decimals (thousandths), fractions (halves, thirds, fourths, ...	**Quarter Mile Math Level 2** **Quarter Mile Math Level 3**
(Gr. 4-8) 1M-E2.Relate the basic arithmetic operations to one another (e.g., multiplication and division are inverse operations) PO 1. Represent the process of multiplication as repeated addition, using concrete or illustrative models 1. whole numbers (Grades 4-5) 2. fractions and decimals (Grades 6-8) PO 2. Represent the process of division as repeated subtraction, partitioning a group and partitioning a whole, using concrete or illustrative models 1. whole numbers (Grades 4-5) 2. fractions and decimals (Grades 6-8) PO 3. Write the family of equations using inverse operations for a given set of numbers 1. whole numbers with addition/ subtraction [(4 + 5 = 9, 5 + 4 = 9, 9 4 = 5, 9 5 = 4) and multiplication/ division] (Grades 4-5) 2. positive ...	**Quarter Mile Math Level 2** **Quarter Mile Math Level 3**
(Gr. 4-8) 1M-E3.Demonstrate proficiency with the operations of multiplication and division of whole numbers PO 1. Calculate multiplication/division 1. three-digit by two-digit to find the product (Grades 4-5) 2. facts through 12 (Grades 4-5) 3. mental math and estimation with multiples of 10 (Grades 4-5) 4. one-digit divisor to find quotient with remainder (Grades 4-5) 5. two-digit divisor, with remainders and rounding in context (e.g., percentages and money) (Grades 6-8) PO 2. Calculate multiplication and division problems using contextual situations (Grades 4-5, 6-8)	**Quarter Mile Math Level 2** **Quarter Mile Math Level 3**
(Gr. 4-8) 1M-E4.Develop and apply number theory concepts (e.g., primes, factors and multiples) to represent numbers in various ways PO 1. State the factors for a given whole number (Grades 4-5) PO 2. Factor a whole number into a product of its primes (prime factorization) (Grades 6-8) PO 3. Identify greatest common factor and least common multiples for a set of whole numbers (Grades 6-8) PO 4. Sort numbers by their properties 1. odd, even (Grades 4-5) 2. prime, composite, square, square root (Grades 6-8) PO 5. Simplify numerical expressions using order of operations (Grades 6-8)	

Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 4-8) 1M-E5.Represent and use numbers in equivalent forms (integers, fractions, percent, decimals, exponents, scientific notation and square roots) PO 1. Add, subtract, multiply and divide integers, positive fractions and decimals (Grades 6-8) PO 2. Demonstrate the relationship and equivalency among 1. decimals, fractions and percents (e.g.,1/2 = .5 = 50% with halves, fourths and tenths) (Grades 4-5) 2. decimals, fractions, ratios, percents (Grades 6-8) PO 3. Factor numbers into prime form and express in exponential form (Grades 6-8) PO 4. Convert standard notation to scientific notation and vice versa with positive exponents (Grades 6-8) PO 5. Determine the square root of a perfect square (Grades 6-8)

Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 4-8) 1M-E6.Recognize that the degree of precision needed in calculating a number depends on how the results will be used and the instruments used to generate the measurements PO 1. Express answers to the appropriate place or degree of precision (e.g., time, money, pi) (Grades 6-8) PO 2. Apply the appropriate strategy (e.g., estimation, approximation, rounding or exact numbers) when calculating to solve problems (Grades 4-5, 6-8) PO 3. Demonstrate/describe the magnitude of 1. whole numbers (e.g., 'How many apples in the orchard?') (Grades 4-5) 2. rational numbers (e.g., 'How small is a bacterium?') (Grades 6-8) Note: We recommend that this be assessed at the district level. PO 4. Interpret calculations and calculator results within a ...

Quarter Mile Math Level 2

Subject: MATH
Standard: Patterns, Algebra And Functions
Strand: Essentials

Substrand **Titles that Address the Substrand**

(Gr. 4-8) 3M-E1.Use algebraic methods (write number sentences, in the form of expressions and equations) to explore, model and describe patterns and functions involving numbers, shapes, data, graphs and data plots PO 1. Extend simple geometric and number patterns (e.g., 1, 1, 2, 1, 1, 3, 1, 1, 4 . . .) (Grades 4-5) PO 2. Create simple geometric and number patterns (Grades 4-5) PO 3. Describe a rule for a simple pattern (e.g., 5, 10, 15, 20 . . . rule = add five or count by fives) (Grades 4-5) PO 4. Generate patterns using algebraic expressions (Grades 6-8)

Quarter Mile Math Level 3

(Gr. 4-8) 3M-E2.Describe, represent and analyze patterns and relationships using shapes, tables, graphs, data plots, verbal rules and standard algebraic notation (This is covered in 3ME1-PO1, PO2, PO3, PO4; and 3ME4-PO1, PO2, PO3, PO4

Quarter Mile Math Level 3

(Gr. 4-8) 3M-E3.Describe the concepts of variables, expressions, equations and inequalities PO 1. Describe and use variables in a contextual situation (Grades 6-8) PO 2. Evaluate an expression using substitution with four basic operations on whole numbers (Grades 6-8) PO 3. Translate a written phrase to an algebraic expression and vice versa (words to symbols and symbols to words) (e.g., the quotient of x and y) (Grades 6-8) PO 4. Express a simple inequality from a contextual situation (e.g., Joe earns more than $5.00 an hour: therefore, x > 5.) (Grades 6-8)

Quarter Mile Math Level 2
Quarter Mile Math Level 3

(Gr. 4-8) 3M-E4.Analyze functional relationships to explain how a change in one variable results in a change in another PO 1. Describe a real-life situation in which a change in one variable results in the change of the other (e.g., temperature in the classroom goes up and the amount of clothing goes down) (Grades 4-5) PO 2. Produce the rule (function) that explains the relationship (pattern) between the numbers when a change in the first variable affects the second variable (T-chart, two-row table, or input/output machine) (Grades 6-8) PO 3. Compute an 'output' for a given 'input' in a function (Grades 4-5) PO 4. Complete a T-chart for a given rule (Grades 6-8)

Quarter Mile Math Level 3

(Gr. 4-8) 3M-E7.Solve simple linear equations and inequalities using a variety of methods (e.g., informal, formal, graphical) and a variety of manipulatives PO 1. Solve equations using 1. whole numbers with one variable-one step (Grades 4-5) 2. whole numbers with one variable-multiple steps (Grades 6-8) PO 2. Solve linear (first degree) equations using models/manipulatives, symbols and/or graphing in a one-step equation (Grades 6-8) PO 3. Graph given data points to represent a linear equation 1. on a coordinate grid with whole numbers (Grades 4-5) 2. in (x, y) form using all four quadrants of a coordinate grid (Grades 6-8)

Quarter Mile Math Level 3

(Gr. 4-8) 3M-E8.Develop, analyze and explain methods for solving proportions PO 1. Describe how to solve a problem in context using a proportion (Grades 6-8) PO 2. Compare quantities using ratios (Grades 6-8) PO 3. Solve proportions using formal (e.g., cross product) or informal methods (e.g., diagrams, geometric models) (Grades 6-8)

Quarter Mile Math Level 2
Quarter Mile Math Level 3

Subject: MATH
Standard: Mathematical Structure/logic
Strand: Proficiency

Substrand **Titles that Address the Substrand**

(Gr. 9-12) 6M-P5.Understand the logic of algebraic procedures PO 1. Determine whether a given algebraic expression and a possible simplified form are equivalent (e.g., show that (x + y)2 = x2 + y2 is invalid) PO 2. Determine whether a given procedure for solving an equation is valid

Quarter Mile Math Level 3

Subject: MATH
Standard: Measurement And Discrete Mathematics
Strand: Distinction

Substrand **Titles that Address the Substrand**

(Gr. 9-12) 5M-D1.Represent and solve problems using linear programming and difference equations

Quarter Mile Math Level 3

Subject: MATH
Standard: Patterns, Algebra And Functions
Strand: Distinction

Substrand **Titles that Address the Substrand**

(Gr. 9-12) 3M-D2.Demonstrate technical facility with algebraic transformations, including techniques based on the theory of equations

Quarter Mile Math Level 3