

KANE AREA SCHOOL DISTRICT



K-12 Mathematics Curriculum 2025

**Development and preparation led by
Mary Tunall, K-5 Math Department Chair, and Julie Alexander, 6-12 Math Department Chair.**

TABLE OF CONTENTS

Elementary

Kindergarten Mathematics.....	3
1 st Grade Mathematics	9
2 nd Grade Mathematics	15
3 rd Grade Mathematics.....	24
4 th Grade Mathematics.....	33
5 th Grade Mathematics.....	41

Middle Level

6 th Grade Mathematics.....	47
6 th Grade Accelerated Mathematics.....	53
7 th Grade Mathematics.....	59
7 th Grade Accelerated Mathematics.....	67
8 th Grade Mathematics.....	76

High School Core

Comprehensive Algebra I	83
Algebra 1	92
Algebra 1B.....	101
Algebra II	111
Geometry	129

High School Electives

Business Mathematics	134
Statistics	139
Precalculus	145
Calculus	154
AP Calculus BC.....	160

Kindergarten Mathematics

Statement of Organization:

This course is designed to increase students' knowledge of numbers, mathematical concepts and their skills in operations and problem solving.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- classroom discussions
- benchmark assessments (Acadience for K-2)

Estimated Instructional Time:

Kindergarten math classes will be instructed for a minimum of 45 minutes a day 5 days a week.

Technology Integration:

In addition to print resources, students will use technology (smart boards, laptops) when available and applicable to achieve learning goals and generate products in conjunction with the standards. Technology will also help to provide differentiation, intervention, and enrichment to students when needed.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
CC.2.1: Numbers and Operations	CC.2.1.K.A.1 Know number names and write and recite the count sequence	****Kindergarten names, writes, and recites the count sequence up to 20	Calendar Day Different Math Number Same Week Month One, Two, Three, Four, Five, Six Seven, Eight, Nine, Ten, Eleven, Twelve, Thirteen, Fourteen Fifteen Graph Backwards Count back Count on Forward Number line First, second, third, fourth, fifth Dots Ten frames	**** Quarter 1/ 45 days *Ongoing review
CC.2.1: Numbers and Operations	CC.2.1.K.A.2 Apply one-to-one correspondence to count the number of objects.	M03.B-O.3.1.5 – Identify arithmetic patterns (including patterns in the addition table or multiplication table) and/or explain them using properties of operations. <i>Example 1: Observe that 4 times a number is always even.</i> <i>Example 2: Explain why 6 times a number can be decomposed into three equal addends.</i> ***Second grade identifies addition and subtraction patterns only. ***First grade identifies addition and subtraction patterns only. **** Kindergarten represents numbers up to 20.	Above Beside Between Color Count Graph Inside Least Match Most Outside Over Shape	****Quarter 1/ 45 days *Ongoing review

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
			Sort Under After Before Less than Penny Heads Tails Add Cent Coin Dime Money Equal Value Worth	
CC.2.1: Numbers and Operations	CC.2.1.K.A.3 Apply the concept of magnitude to compare numbers and quantities	M03.A-T.1.1.4 – Order a set of whole numbers from least to greatest or greatest to least (up through 9,999, and limit sets to no more than four numbers). **Second grade orders whole numbers through 999. ***First grade orders whole numbers through 100. ****Kindergarten compares numbers by matching and counting. Kindergarten compares two numbers up to 10.	Compare Fewer More	****Quarter 1/ 35 days ****Quarter 2/ 12 days *Ongoing review
CC.2.1: Numbers and Operations	CC.2.1.K.B.1 Use place value to compose and decompose numbers within 19.	M03.A-T.1.1.2 – Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three-digit numbers from three-digit whole numbers. ***First grade finds sums and differences within 100. Mental strategies to 10. ****Kindergarten counts blocks up to 20 and counts and writes tens and ones up to 20.	Combination Equal Divide	****Quarter 1/ 45 days *Ongoing review

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
CC.2.2: Algebraic Concepts	CC.2.2.K.A.1 Extend concepts of putting together and taking apart to add and subtract within 10.	M03.A-T.1.1.2. – Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three-digit numbers from three-digit whole numbers. ** Second grade finds sums within 100. ***First grade finds sums within 20. ****Kindergarten adds and subtracts numbers to 10. M03.B-O.3.1.1 – Solve two-step word problems using the four operations (expressions are not explicitly stated). Limit to problems with whole numbers and having whole-number answers. ** Second grade problems are one-step addition or subtraction. ***First grade problems are one-step addition or subtraction. ****Kindergarten completes addition and subtraction word problems with numbers to 10. M03.B-O.3.1.2 – Represent two-step word problems using equations with a symbol standing for the unknown quantity. Limit to problems with whole numbers and having whole-number answers. ** Second grade problems are one-step addition or subtraction, without symbols. *** First grade problems are one-step addition or subtraction, without symbols. ****Kindergarten completes addition and subtraction word problems with numbers to 10. M03.B-O.3.1.6 – Create or match a story to a given combination of symbols (+, -, X, <, >, and =) and numbers.	Ball Sphere Box Rectangular Prism Can Cylinder Circle Corner Geometry Round Shape Solid Side Square Triangle	****Quarter 2/32 days ****Quarter 2/ 32 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		Second grade problems are one-step addition or subtraction equations. *First grade problems are one-step addition or subtraction equations. ****Kindergarten completes addition and subtraction word problems with numbers to 10. M03.B-O.3.1.7 – Identify the missing symbol (+, -,x,+,<,>,and =) that makes a number sentence. **Second grade problems identify the process of one-step addition or subtraction equations. ***First grade problems identify the process of one-step addition or subtraction equations. ****Kindergarten completes addition and subtraction word problems with numbers to 10.		****Quarter 3/30 days
CC.2.3: Geometry	CC.2.3.K.A.1 Identify and describe two- and three-dimensional shapes.	M03.C-G.1.1.2 - Recognize rhombi, rectangles, and squares as examples of quadrilaterals and/or draw examples of quadrilaterals that do not belong to any of these subcategories. **Second grade identifies shapes up to six sides. ***First grade identifies shapes up to four sides. ****Kindergarten recognizes circle, triangle, square, and rectangle and identifies 3-d shapes.	Ball Sphere Box Rectangular prism Can Cylinder Circle Corner Geometry Round Shape Solid Side Square Triangle	****Quarter 3/30 days

1st Grade Mathematics

Statement of Organization:

This course is designed to increase students' knowledge of numbers, mathematical concepts and their skills in operations and problem solving.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- standardized tests
- teacher-made tests
- classroom discussions
- benchmark assessments (Acadience Numeracy and Computation)

Estimated Instructional Time:

First grade math classes will be instructed for a minimum of 60 minutes 5 days a week.

Technology Integration:

In addition to print resources, students will use technology (smart boards, laptops) when available and applicable to achieve learning goals and generate products in conjunction with the standards. Technology will also help to provide differentiation, intervention, and enrichment to students when needed.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	C.2.1.2.B.1 Use place-value concepts to represent amounts of tens and ones and to compare three-digit numbers.	M03.A-T.1.1.1 - Round two- and three-digit whole numbers to the nearest ten or hundred, respectively. **Second grade rounds only two-digit whole numbers. ***First grade rounds/compares only one-digit whole numbers. M03.A-T.1.1.4 - Order a set of whole numbers from least to greatest or greatest to least (up through 9,999, and limit sets to no more than four numbers). **Second grade orders whole numbers through 999. ***First grade orders whole numbers through 100.	Counting Tens and ones Count and compare Compare Order Make 10 Number symbol Count on Count back Number bond Number line Greater/est Smaller/est	75 Days- concurrent with other Standards
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC.2.1.2.B.2 Use place-value concepts to read, write, and skip count to 1000.	M03.B-O.3.1.5 - Identify arithmetic patterns (including patterns in the addition table or multiplication table) and/or explain them using properties of operations. <i>Example 1: Observe that 4 times a number is always even.</i> <i>Example 2: Explain why 6 times a number can be decomposed into three equal addends.</i> **Second grade identifies addition and subtraction patterns only. ***First grade identifies addition and subtraction patterns only.	Counting Tens and ones Count and compare Compare Order Make 10 Number symbol Count on Count back Number bond Number line	75 Days- concurrent with other Standards
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC.2.1.2.B.3 Use place-value understanding and properties of operations to add and subtract within 1000.	M03.A-T.1.1.2 - Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three-digit numbers from three-digit whole numbers. **Second grade finds sums within 100. ***First grade finds sums within 20. M03.B-O.2.1.1 - Apply the commutative property of multiplication (not identification or definition of the property). **Second grade applies the commutative property of addition.	Counting Tens and ones Count and compare Compare Order Make 10 Number symbol Count on Count back Number bond	75 Days- concurrent with other Standards

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		***First grade applies the commutative property of addition. M03.B-O.2.1.2 - Apply the associative property of multiplication (not identification or definition of the property). **Second grade applies the associative property of addition. ***First grade applies the associative property of addition.	Number line Addition Subtraction Sum Difference Repeated addition Base 10 Counters Altogether Between	
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.2.A.1 Represent and solve problems involving addition and subtraction within 100.	M03.B-O.3.1.1 - Solve two-step word problems using the four operations (expressions are not explicitly stated). Limit to problems with whole numbers and having whole-number answers. **Second grade problems are one-step addition or subtraction. ***First grade problems are one-step addition or subtraction. M03.B-O.3.1.2 - Represent two-step word problems using equations with a symbol standing for the unknown quantity. Limit to problems with whole numbers and having whole-number answers. **Second grade problems are one-step addition or subtraction, without symbols. ***First grade problems are one-step addition or subtraction, without symbols. M03.B-O.3.1.6 - Create or match a story to a given combination of symbols (+, -, ×, ÷, <, >, and =) and numbers. **Second grade problems are one-step addition or subtraction equations. ***First grade problems are one-step addition or subtraction equations.	Counting Tens and ones Count and compare Compare Order Make 10 Count on Count back Number bond Number line Addition Subtraction Sum Difference Repeated addition Base 10 Counters Altogether Make 10 Missing number After Before Plus Minus	82 Days-concurrent with other Standards

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.B-O.3.1.7 - Identify the missing symbol (+, −, ×, ÷, <, >, and =) that makes a number sentence true. **Second grade problems identify the process of one-step addition or subtraction equations. ***First grade problems identify the process of one-step addition or subtraction equations.		
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.2.A.2 Use mental strategies to add and subtract within 20.	M03.A-T.1.1.2 - Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three-digit numbers from three-digit whole numbers. ***First grade finds sums and differences within 100. Mental strategies to 10	Count on Count back Number bond Number line Addition Subtraction Sum Difference Two-digit number	75 Days- concurrent with other Standards
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.2.A.3 Work with equal groups of objects to gain foundations for multiplication.	M03.A-T.1.1.3 - Multiply one-digit whole numbers by two-digit multiples of 10 (from 10 through 90). **Second grade multiplication is within 5×5 only. ***First grade multiplication by simple addition and rectangular arrays	Arrays Skip count Repeated addition Equal groups Altogether In all Multiply Putting together	16 days
2.3 Geometry A. Geometry	CC.2.3.2.A.1 Analyze and draw two and three-dimensional shapes having specified attributes.	M03.C-G.1.1.1 - Explain that shapes in different categories may share attributes and that the shared attributes can define a larger category. <i>Example 1: A rhombus and a rectangle are both quadrilaterals since they both have exactly four sides.</i> <i>Example 2: A triangle and a pentagon are both polygons since they are both multi-sided plane figures.</i> **Second grade identifies shapes up to six sides. ***First grade identifies shapes up to four sides.	Triangle Equal Square Circle Rectangle Solid shape Face Sides Vertex/corner Shape Attributes	21 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.C-G.1.1.2 - Recognize rhombi, rectangles, and squares as examples of quadrilaterals and/or draw examples of quadrilaterals that do not belong to any of these subcategories. **Second grade identifies shapes up to six sides. ***First grade identifies shapes up to four sides.	Size Color	
2.3 Geometry A. Geometry	CC.2.3.2.A.2 Use the understanding of fractions to partition shapes into halves, quarters, and thirds.	M03.C-G.1.1.3 - Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. <i>Example 1: Partition a shape into 4 parts with equal areas. Example 2: Describe the area of each of 8 equal parts as $\frac{1}{8}$ of the area of the shape.</i> **Second grade partitions shapes into 2, 3, or 4 parts. *** First grade partitions shapes into 2 or 4 parts.	Part Whole Quarter/fourths Half Equal	6 days
Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.1 Measure and estimate lengths in standard units using appropriate tools.	M03.D-M.2.1.3 - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Display the data by making a line plot, where the horizontal scale is marked in appropriate units—whole numbers, halves, or quarters. **Second grade measures lengths of whole number inches only. ***First grade measures lengths of whole number using “units of measure”.	Length Height Tall/er/est High/er/est Short/er/est As long as As short as Compare Capacity Units	6 days
Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.2 Tell and write time to the nearest five minutes using both analog and digital clocks.	M03.D-M.1.1.1 - Tell, show, and/or write time (analog) to the nearest minute. **Second grade tells time to five minutes. ***First grade tells time to the half hour. M03.D-M.1.1.2 - Calculate elapsed time to the minute in a given situation (total elapsed time limited to 60 minutes or less). **Second grade finds elapsed time to nearest quarter hour up to one hour or whole hour increments (over one hour).	Telling time To the hour On the hour Half past the hour Sequence Clock Analog Digital Estimate Hour Half hour	6 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		***First grade estimates time to nearest half hour up to one hour or whole hour increments (over one hour).	Morning Afternoon Evening Night O'clock	
Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.3 Solve problems and make change using coins and paper currency with appropriate symbols.	M03.D-M.1.3.1 - Compare total values of combinations of coins (penny, nickel, dime, and quarter) and/or dollar bills less than \$5.00. **Second grade counts coins or money up to \$2. ***First grade identifies and counts coins and money up to \$1. M03.D-M.1.3.2 - Make change for an amount up to \$5.00 with no more than \$2.00 change given (penny, nickel, dime, quarter, and dollar). **Second grade makes change from a dollar or less.	Add Skip count Dollar Half dollar Quarter Dime Nickel Penny Value Money	8 days
Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.4 Represent and interpret data using line plots, picture graphs, and bar graphs.	M03.D-M.2.1.1 - Complete a scaled pictograph and a scaled bar graph to represent a data set with several categories (scales limited to 1, 2, 5, and 10). **Second grade graphs are not scaled. ***First grade graphs are scaled to 10 to represent data in several categories. M03.D-M.2.1.2 - Solve one- and two-step problems using information to interpret data presented in scaled pictographs and scaled bar graphs (scales limited to 1, 2, 5, and 10). <i>Example 1: (One-step) "Which category is the largest?"</i> <i>Example 2: (Two-step) "How many more are in category A than in category B?"</i> **Second grade problems are one-step only. ***First grade problems are two-step.	Compare Represent Picture graph Bar graph More than Less than As many as Similar	9 days

2nd Grade Mathematics

Statement of Organization:

This course is designed to increase students' knowledge of numbers, mathematical concepts and their skills in operations and problem solving.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- standardized tests
- teacher-made tests
- classroom discussions
- benchmark assessments (Acadience Computation and Concepts and Applications)

Estimated Instructional Time:

Second grade math classes will be instructed for a minimum of 60 minutes 5 days a week.

Technology Integration:

In addition to print resources, students will use technology (smart boards, laptops) when available and applicable to achieve learning goals and generate products in conjunction with the standards. Technology will also help to provide differentiation, intervention, and enrichment to students when needed.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	C.2.1.2.B.1 Use place-value concepts to represent amounts of tens and ones and to compare three-digit numbers.	M03.A-T.1.1.1 - Round two- and three-digit whole numbers to the nearest ten or hundred, respectively. **Second grade rounds only two-digit whole numbers. M03.A-T.1.1.4 -Order a set of whole numbers from least to greatest or greatest to least(up through 9,999, and limit sets to no more than 4 numbers). **Second grade orders whole numbers through 999.	Compare Hundred Is greater than > Is less than < Ones Round Thousand	Quarter 1: 18 days Quarter 2: 6 days
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC.2.1.2.B.2 Use place-value concepts to read, write, and skip count to 1000.	M03.B-O.3.1.5 – Identify arithmetic patterns (including patterns in the addition table or multiplication table) and/or explain them using properties of operations. <i>Example 1: Observe that 4 times a number is always even.</i> <i>Example 2: Explain why 6 times a number can be decomposed into three equal addends.</i> **Second grade identifies addition and subtraction patterns only.	Even Expanded form Odd Pattern Skip count Standard form Word form	Quarter 1: 18 days
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC.2.1.2.B.3 Use place-value understanding and properties of operations to add and subtract within 1000.	M03.A-T.1.1.2 - Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three-digit numbers from three-digit whole numbers. **Second grade finds sums and differences within 1000. M03.B-O.2.1.1 - Apply the commutative property of multiplication (not identification or definition of the property). **Second grade applies the commutative property of addition. M03.B-O.2.1.2 – Apply the associative property of multiplication (not identification or definition of the property). **Second grade applies the associative property of addition.	Addend Digit Is equal to = Sum Difference Equation Fact Family Operation Part Whole	Quarter 1: 11 days Quarter 2: 33 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.2.A.1 Represent and solve problems involving addition and subtraction within 100.	M03.B-O.3.1.1 - Solve two-step word problems using the four operations (expressions are not explicitly stated). Limit to problems with whole numbers and having whole-number answers. **Second grade problems are one-step addition or subtraction. M03.B-O.3.1.2 - Represent two-step word problems using equations with a symbol standing for the unknown quantity. Limit to problems with whole numbers and having whole-number answers. **Second grade problems are one-step addition or subtraction, without symbols. M03.B-O.3.1.6 - Create or match a story to a given combination of symbols (+, -, ×, ÷, <, >, and =) and numbers. **Second grade problems are one-step addition or subtraction equations. M03.B-O.3.1.7 - Identify the missing symbol (+, -, ×, ÷, <, >, and =) that makes a number sentence true. **Second grade problems identify the process of one-step addition or subtraction equations.	Added Column Difference Digit Equation Fact family Is equal to = Ones Regroup Tens	Quarter 1: 3days Quarter 2: 8 days
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.2.A.2 Use mental strategies to add and subtract within 20.	M03.B-O.2.2.1 - Interpret and/or model division as a multiplication equation with an unknown factor. <i>Example: Find $32 \div 8$ by solving $8 \times ? = 32$.</i> **Second grade interprets subtraction as an addition equation with an unknown factor. M03.B-O.3.1.3 - Assess the reasonableness of answers. Limit problems posed with whole numbers and having whole-number answers.	Fact family Operation Place value	Quarter 1: 7 days Quarter 2: 6 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.2.A.3 Work with equal groups of objects to gain foundations for multiplication.	M03.A-T.1.1.3 - Multiply one-digit whole numbers by two-digit multiples of 10 (from 10 through 90). **Second grade multiplication is within 5×5 only. M03.B-O.1.1.1 - Interpret and/or describe products of whole numbers (up to and including 10×10). <i>Example 1: Interpret 35 as the total number of objects in 5 groups, each containing 7 objects.</i> <i>Example 2: Describe a context in which a total number of objects can be expressed as 5×7.</i> **Second grade multiplication is within 5×5 only. M03.B-O.1.1.2 - Interpret and/or describe whole-number quotients of whole numbers (limit dividends through 50 and limit divisors and quotients through 10). <i>Example 1: Interpret $48 \div 8$ as the number of objects in each share when 48 objects are partitioned equally into 8 shares, or as a number of shares when 48 objects are partitioned into equal shares of 8 objects each.</i> <i>Example 2: Describe a context in which a number of shares or a number of groups can be expressed as $48 \div 8$.</i> **Second grade uses dividends through 25 and divisors and quotients through 5. M03.B-O.1.2.1 - Use multiplication (up to and including 10×10) and/or division (limit dividends through 50 and limit divisors and quotients through 10) to solve word problems in situations involving equal groups, arrays, and/or measurement quantities. **Second grade multiplication is within 5×5 only, and division uses dividends through 25 and divisors and quotients through 5.	Array Equal groups Groups of Multiply Repeated addition	Quarter 4: 3 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.B-O.1.2.2 - Determine the unknown whole number in a multiplication (up to and including 10×10) or division (limit dividends through 50 and limit divisors and quotients through 10) equation relating three whole numbers. <i>Example: Determine the unknown number that makes an equation true.</i> **Second grade multiplication is within 5×5 only, and division uses dividends through 25 and divisors and quotients through 5. M03.B-O.2.2.1 - Interpret and/or model division as a multiplication equation with an unknown factor. <i>Example: Find $32 \div 8$ by solving $8 \times ? = 32$.</i> **Second grade multiplication is within 5×5 only, and division uses dividends through 25 and divisors and quotients through 5.		
2.3 Geometry A. Geometry	CC.2.3.2.A.1 Analyze and draw two and three-dimensional shapes having specified attributes.	M03.C-G.1.1.1 - Explain that shapes in different categories may share attributes and that the shared attributes can define a larger category. <i>Example 1: A rhombus and a rectangle are both quadrilaterals since they both have exactly four sides.</i> <i>Example 2: A triangle and a pentagon are both polygons since they are both multi-sided plane figures.</i> **Second grade identifies shapes up to six sides. M03.C-G.1.1.2 - Recognize rhombi, rectangles, and squares as examples of quadrilaterals and/or draw examples of quadrilaterals that do not belong to any of these subcategories. **Second grade identifies shapes up to six sides.	2D 3D Angle Circle Cone Cube Cylinder Edge face Hexagon Line of Symmetry Parallel sides Parallelogram Pentagon Quadrilateral Rectangle Rectangular prism Rhombus Sides Sphere Square	Quarter 4: 7 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
			Trapezoid Triangle Vertex	
2.3 Geometry A. Geometry	CC.2.3.2.A.2 Use the understanding of fractions to partition shapes in halves, quarters, and thirds	M03.A-F.1.1.1 - Demonstrate that when a whole or set is partitioned into y equal parts, the fraction $1/y$ represents 1 part of the whole and/or the fraction x/y represents x equal parts of the whole (limit denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; and no simplification necessary). **Second grade uses denominators of 2, 3, and 4. M03.A-F.1.1.2 - Represent fractions on a number line (limit denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; and no simplification necessary). M03.A-F.1.1.3 - Recognize and generate simple equivalent fractions (limit the denominators to 1, 2, 3, 4, 6, and 8 and limit numerators to whole numbers less than the denominator). <i>Example 1: $1/2 = 2/4$</i> <i>Example 2: $4/6 = 2/3$</i> **Second grade uses denominators of 2, 3, and 4. M03.A-F.1.1.4 - Express whole numbers as fractions, and/or generate fractions that are equivalent to whole numbers (limit denominators to 1, 2, 3, 4, 6, and 8). <i>Example 1: Express 3 in the form $3 = 3/1$.</i> <i>Example 2: Recognize that $6/1 = 6$.</i> **Second grade understands a whole as a fraction with denominators of 2, 3, or 4.	Denominator Fourth of Fourths Fraction Half of Halves Numerator Quarter of Third of Thirds	Quarter 4: 5 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.A-F.1.1.5 - Compare two fractions with the same denominator (limit denominators to 1, 2, 3, 4, 6, and 8), using the symbols $>$, $=$, or $<$, and/or justify the conclusions. **Second grade uses denominators of 2, 3, and 4. M03.C-G.1.1.3 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. <i>Example 1: Partition a shape into 4 parts with equal areas.</i> <i>Example 2: Describe the area of each of 8 equal parts as $1/8$ of the area of the shape.</i> **Second grade partitions shapes into 2, 3, or 4 parts.		
2.9 Measurement, Data, and Probability A. Measurement and data	CC.2.4.2.A.1 Measure and estimate lengths in standard units using appropriate tools.	M03.D-M.1.2.3- Use a ruler to measure lengths to the nearest quarter inch or centimeter. **Second grade measures to nearest whole inch or centimeters. M03.D-M.2.1.3 - Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Display the data by making a line plot, where the horizontal scale is marked in appropriate units—whole numbers, halves, or quarters. **Second grade measures lengths of whole number inches only. M03.D-M.1.2.1 - Measure and estimate liquid volumes and masses of objects using standard units (cups [c], pints [pt], quarts [qt], gallons [gal], ounces [oz.], and pounds [lb]) and metric units (liters [l], grams [g], and kilograms [kg]). **Second grade uses units of cups, pints, quarts, gallons, liters, and grams.	Centimeters Cups Gallons Grams Inches Length Liters Measure Pints Quarts Ruler	Quarter 3: 10 days
2.4 Measurement, Data and Probability A. Measurement and Data	CC.2.4.2.A.2 Tell and write time to the nearest five minutes using both analog and digital clocks.	M03.D-M.1.1.1 Tell, show, and/or write time (analog) to the nearest minute. **Second grade tells time to five minutes.	a.m. analog clock digital clock	Quarter 3: 5 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.D-M.1.1.2 Calculate elapsed time to the minute in a given situation (total elapsed time limited to 60 minutes or less). **Second grade finds elapsed time to nearest quarter hour up to one hour or whole hour increments (over one hour).	elapsed time half past hour midnight minute p.m quarter after quarter to second	
2.4 Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.3 Solve problems and make changes using coins and paper currency with appropriate symbols.	M03.D-M.1.3.1 - Compare total values of combinations of coins (penny, nickel, dime, and quarter) and/or dollar bills less than \$5.00. **Second grade counts coins or money up to \$2. M03.D-M.1.3.2-Make change for an amount up to \$5.00 with no more than \$2.00 change given (penny, nickel, dime, quarter, and dollar). **Second grade makes change from a dollar or less.	Cents Decimal point Dime Dollar Dollar sign Nickel Penny	Quarter 3: 7 days
2.4 Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.4 Represent and interpret data using line plots, picture graphs, and bar graphs.	M03.D-M.2.1.1 - Complete a scaled pictograph and a scaled bar graph to represent a data set with several categories (scales limited to 1, 2, 5, and 10). **Second grade graphs are not scaled. M03.D-M.2.1.2 – Solve one- and two-step problems using information to interpret data presented in scaled pictographs and scaled bar graphs (scales limited to 1, 2, 5, and 10). <i>Example 1: (one-step) “Which category is the largest?”</i> <i>Example 2: (two-step) “How many more are in category A than in Category B?”</i> **Second grade problems are one-step only.	Bar graph Compare Data Digit Key Line Plot Picture Graph Sum Survey Tally Tally Chart	Quarter 4: 6 days

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2 . 4 Measurement, Data, and Probability A. Measurement and Data	CC.2.4.2.A.6 Extend the concepts of addition and subtraction to problems involving length.	M03.B-O.3.1.3 - Assess the reasonableness of answers. Limit problems posed with whole numbers and having whole number answers. M03.D-M.1.2.2 - Add, subtract, multiply, and divide to solve one-step word problems involving masses or liquid volumes that are given in the same units. **Second grade problems include addition and subtraction only. M03.D-M.3.1.1 - Measure areas by counting unit squares (square cm, square m, square in., square ft, and non-standard square units). M03.D-M.3.1.2 - Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems and represent whole- number products as rectangular areas in mathematical reasoning. **Second grade finds area by counting squares. M03.D-M.4.1.1 - Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, exhibiting rectangles with the same perimeter and different areas, and exhibiting rectangles with the same area and different perimeters. Use the same units throughout the problem. **Second grade finds perimeter of a rectangle with known side lengths only.	Area Difference Length Perimeter Sum	Quarter 3: 6 days

Third Grade Mathematics

Statement of Organization:

This course is designed to increase students' knowledge of numbers, mathematical concepts and their skills in operations and problem solving.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Drill and practice
- Demonstration
- Teacher observation
- Standardized tests
- Teacher-made tests
- Classroom discussions
- Benchmark assessments

Estimated Instructional Time:

Third grade math classes will be instructed for a minimum of 75 minutes, 5 days a week.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology (smart boards, laptops) when available to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC.2.1.3.B.1 - Apply place-value understanding and properties of operations to perform multi-digit arithmetic. M03.A-T.1.1 Apply place-value strategies to solve problems	M03.A-T.1.1.1 Round two- and three-digit whole numbers to the nearest ten or hundred, respectively. M03.A-T.1.1.2 Add two- and three-digit whole numbers (limit sums from 100 through 1,000) and/or subtract two- and three- digit numbers from three-digit whole numbers. M03.A-T.1.1.3 Multiply one-digit whole numbers by two-digit multiples of 10 (from 10 through 90). M03.A-T.1.1.4 Order a set of whole numbers from least to greatest or greatest to least (up through 9,999, and limit sets to no more than four numbers).	Place value Written form Standard form Expanded form Compare Greater than Less than Equal Equivalent Round Addend Sum Difference Product Bar model part/whole	M03.A-T.1.1.1 M03.A-T.1.1.2 M03.A-T.1.1.4 Quarter 1 M03.A-T.1.1.3 Quarter 2
2.1 Numbers and Operations C. Numbers and Operations-Fractions	CC.2.1.3.C.1 Explore and develop an understanding of fractions as numbers M03.A-F.1.1 Develop and apply number theory concepts to compare quantities and magnitudes of fractions and whole numbers.	M03.A-F.1.1.1 Demonstrate that when a whole or set is partitioned into y equal parts, the fraction $1/y$ represents 1 part of the whole and/or the fraction x/y represents x equal parts of the whole (limit denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; and no simplification necessary). M03.A-F.1.1.2 Represent fractions on a number line (limit denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; and no simplification necessary.	Factors Multiples Numerator Denominator Equivalent Mixed number	Introduction to fractions in Quarter 2 – 1 day Fraction unit: end of Quarter 3- Quarter 4 Weekly review end of quarter 2 through quarter 4.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.A-F.1.1.3 Recognize and generate simple equivalent fractions (limit the denominators to 1, 3, 4, 6, and 8, and limit numerators to whole numbers less than the denominator). <i>Example 1: $\frac{1}{2} = \frac{2}{4}$ Example 2: $\frac{4}{6} = \frac{2}{3}$</i> M03.A-F.1.1.4 Express whole numbers as fractions, and/or generate fractions that are equivalent to whole numbers (limit denominators to 1, 2, 3, 4, 6, and 8). <i>Example 1: Express 3 in the form $3 = \frac{3}{1}$.</i> <i>Example 2: Recognize that $\frac{6}{1} = 6$.</i> M03.A-F.1.1.5 Compare two fractions with the same denominator (limit denominators to 1, 2, 3, 4, 6, and 8), using the symbols $>$, $=$, or $<$, and/or justify the conclusions.		Introduction to fractions in Quarter 2 – 1 day Fraction unit: end of Quarter 3- Quarter 4 Weekly review end of Quarter 2 through Quarter 4.
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.3.A.1 Represent and solve problems involving multiplication and division. M03.B-O.1.1 Understand various meanings of multiplication and division.	M03.B-O.1.1.1 Interpret and/or describe products of whole numbers (up to and including 10×10). <i>Example 1: Interpret 35 as the total number of objects in 5 groups, each containing 7 objects.</i> <i>Example 2: Describe a context in which a total number of objects can be expressed as 5×7.</i> M03.B-O.1.1.2 Interpret and/or describe whole-number quotients of whole numbers (limit dividends through 50 and limit divisors and quotients through 10).	Array Product Factor Quotient Dividend Divisor Expression equation	End of Quarter 2- Quarter 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		<i>Example 1: Interpret $48 \div 8$ as the number of objects in each share when 48 objects are partitioned equally into 8 shares, or as a number of shares when 48 objects are partitioned into equal shares of 8 objects each.</i> <i>Example 2: Describe a context in which a number of shares or a number of groups can be expressed as $48 \div 8$.</i>		
	M03.B-O.1.2 Solve mathematical and real-world problems using multiplication and division, including determining the missing number in a multiplication and/or division equation.	M03.B-O.1.2.1 Use multiplication (up to and including 10×10) and/or division (limit dividends through 50 and limit divisors and quotients through 10) to solve word problems in situations involving equal groups, arrays, and/or measurement quantities. M03.B-O.1.2.2 Determine the unknown whole number in a multiplication (up to and including 10×10) or division (limit dividends through 50 and limit divisors and quotients through 10) equation relating to three whole numbers. <i>Example: Determine the unknown number that makes an equation true.</i>		Multiplication: quarter 2 Division: Quarter 3
	CC.2.2.3.A.2 Understand properties of multiplication and the relationship between multiplication and division. M03.B-O.2.1 Use properties to simplify and solve multiplication problems.	M03.B-O.2.1.1 Apply the commutative property of multiplication (not identification of definition of the property). M03.B-O.2.1.2 Apply associative property of multiplication (not identification or definition of the property).	Commutative Property Associative Property	End Quarter 2 – Quarter 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
	M03.B-O.2.2 Relate division to a missing-number multiplication equation.	M03.B-O.2.2.1 Interpret and/or model division as a multiplication equation with an unknown factor. <i>Example: Find $32 \div 8$ by solving $8 \times ? = 32$.</i>		End Quarter 2-Quarter 3
	CC.2.2.3.A.4 Solve problems involving the four operations and identify and explain patterns in arithmetic.	M03.B-O.3.1.1 Solve two-step word problems using the four operations (expressions are not explicitly stated). Limit to problems with whole numbers and having whole-number answers.	Parenthesis Order of operations Reasonableness Remaining	Mid Quarter 3 into beginning of Quarter 4
	M03.B-O.3.1 Use operations, patterns, and estimation strategies to solve problems (may include word problems).	M03.B-O.3.1.2 Represent two-step word problems using equations with a symbol standing for the unknown quantity. Limit to problems with whole numbers and having whole-number answers. M03.B-O.3.1.3 Assess the reasonableness of answers. Limit problems posed with whole numbers and having whole-number answers. M03.B-O.3.1.4 Solve two-step equations using order of operations (equation is explicitly stated with no grouping symbols). M03.B-O.3.1.5 Identify arithmetic patterns (including patterns in addition table or multiplication table) and/or explain them using properties of operations. <i>Example 1: Observe that 4 times a number is always even.</i> <i>Example 2: Explain why 6 times a number can be decomposed into three equal addends.</i>		All competencies continue from Quarters 1-4, as operations are taught/mastered

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.B-O.3.1.6 Create or match a story to a given combination of symbols (+, -, x, ÷, <, >, and =) and numbers. M03.B-O.3.1.7 Identify the missing symbol (+, =, x, ÷, <, >, and =) that makes a number sentence true.		
2.3 Geometry A. Geometry	CC.2.3.3.A.1 Identify, compare, and classify shapes and their attributes. CC.2.3.3.A.2 Use the understanding of fractions to partition shapes into parts with equal areas and express the area of each part as a unit fraction of a whole. M03.C-G.1.1 Analyze characteristics of polygons.	M03.C-G.1.1.1 Explain that shapes in different categories may share attributes and that the shared attributes can define a larger category. <i>Example 1: A rhombus and a rectangle are both quadrilaterals since they both have exactly four sides.</i> <i>Example 2: A triangle and a pentagon are both polygons since they are both multi-sided plane figures.</i> M03.G-C.1.1.2 Recognize rhombi, rectangles, and squares as examples of quadrilaterals and/or draw examples of quadrilaterals that do not belong to any of these subcategories. M03.G-C.1.1.3 Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. <i>Example 1: Partition a shape into 4 parts with equal areas.</i> <i>Example 2: Describe the area of each of 8 equal parts as 1/8 of the area of the shape.</i>	Angle Side Acute Obtuse Right Triangle Quadrilateral Parallelogram Trapezoid Rectangle Square Rhombus Pentagon Hexagon Octagon Congruent Sides Angles Vertex Face Symmetrical Line of symmetry	Introduce in Quarter 3, then begin unit at the end of Quarter 3 through Quarter 4.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
Measurement, Data and Probability A. Measurement and Data	CC.2.4.3.A.2 Tell and write time to the nearest minute and solve problems by calculating time intervals. M03.D-M.1.1 Determine or calculate time and elapsed time.	M03.D-M.1.1.1 Tell, show, and/or write time (analog) to the nearest minute. M03.D-M.1.1.2 Calculate elapsed time to the minute in a given situation (total elapsed time limited to minutes of less).	Analog Digital Elapsed Minute hand Hour hand Minute Hour Seconds Quarter to/past/till/after O'clock Half past	Introduce in quarter 3, then begin unit in quarter 4.
Measurement, Data, and Probability A. Measurement and Data	CC.2.4.3.A.1 Solve problems involving measurement and estimation of temperature, liquid, volume, mass and length. M03.D-M.1.2 Use the attributes of liquid volume, mass, and length.	M03.D-M.1.2.1 Measure and estimate liquid volumes and masses of objects using standard units (cups [c.], pints [pt], quarts [qt], gallons [gal], ounces [oz], and pounds [lb]), and metric units (liters [l], grams [g], and kilograms [kg]). M03.D-M.1.2.2 Add, subtract, multiply, and divide to solve one-step word problems involving masses or liquid volumes that are given in the same units. M03.D-M.1.2.3 Use a ruler to measure lengths to the nearest quarter inch or centimeter.	Volume Mass Pints Quarts Gallons Ounces Pounds Liters Grams Kilograms Ruler Inch Centimeter	Quarter 3 and 4
	M03.D-M.1.3 Count, compare, and make change using a collection of coins and one-dollar bills.	M03.D-M.1.3.1 Compare total values of combinations of coins (penny, nickel, dime, and quarter) and/or dollar bills less than \$5.00.		End of Quarter 3, then Quarter 4

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M03.D-M.1.3.2 Make change for an amount up to \$5.00 with no more than \$2.00 change given (penny, nickel, dime, quarter, and dollar). M03.D-M.1.3.3. Round amounts of money to the nearest dollar.		
2.4 Measurement, Data, and Probability A. Measurement and Data	M03.D-M.2.1 Organize, display, and answer questions based on data.	M03.D-M.2.1.1 Complete a scaled pictograph and a scaled bar graph to represent a data set with several categories (scales limited to 1, 2, 5, and 10). M03.D-M.2.1.2 Solve one- and two-step problems using information to interpret data presented in scaled pictographs and scaled bar graphs (scales limited to 1, 2, 5, and 10). <i>Example 1:(one-step) “Which category is the largest?”</i> <i>Example 2: (two-step) “How many more are in category A than in category B?”</i> M03.D-M.2.1.3 Generate measurement data by measuring lengths using rulers marked with halves and fourths of an inch. Display the data by making a line plot, where the horizontal scale is marked in appropriate units – whole numbers, halves, or quarters. M03.D-M.2.1.4 Translate information from one type of display to another. Limit to pictographs, tally charts, bar graphs, and tables. <i>Example: Convert a tally chart to a bar graph.</i>	Line plot Number line Tally chart Table Pictograph Bar graph Scale Title Labels Data	Quarter 1 Quarters 1-4 Quarters 1 and 2

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
	M03.D-M.3.1 Find the area of plane figures.	M03.D-M.3.1.1 Measure areas by counting unit squares (square cm, square m, square in., and non-standard square units). M03.D-M.3.1.2 Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real-world and mathematical problems and represent whole-number products as rectangular areas in mathematical reasoning.	Area Length Width Units squared	End of Quarter 3, then Quarter 4
	M03.D-M.4.1 Find and use the perimeters of plane figures.	M03.D-M.4.1.1 Solve real-world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, exhibiting rectangles with the same perimeter and different areas, and exhibiting rectangles with the same area and different perimeters. Use the same units throughout the problem.	Perimeter	End of Quarter 3, then Quarter 4

Fourth Grade Mathematics

Statement of Organization:

This course is designed to increase students' knowledge of numbers, mathematical concepts and their skills in operations and problems solving.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Drill and practice
- Demonstration
- Teacher observation
- Standardized tests
- Teacher-made tests
- Classroom discussions
- Benchmark assessments

Estimated Instructional Time:

Fourth grade math classes will be instructed for a minimum of 75 minutes 5 days a week.

Sequence

- 1.) Place Value, Addition and Subtraction to One Million
- 2.) Multiplying by One Digit Numbers
- 3.) Multiplying Two Digit Numbers
- 4.) Dividing by One Digit Numbers
- 5.) Factors, Multiples, and Patterns
- 6.) Fraction Equivalence and Comparison
- 7.) Add and Subtract Fractions
- 8.) Multiply Fractions by Whole Numbers
- 9.) Relate Fractions and Decimals
- 10.) Two Dimensional Figures
- 11.) Angles
- 12.) Relative Sizes of Measurement Units
- 13.) Algebra: Perimeter and Area

Technology Integration:

In addition to print resources, students will use technology (smart boards, laptops) when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.1 Numbers and Operations (B) Numbers and Operations in Base Ten	CC.2.1.4.B.1 M04.A-T.1.1 Apply place-value and numeration concepts to compare, find equivalencies, and round.	Place Value of Multi-Digit Whole Numbers M04.A-T.1.1.1 Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right. <i>Example: Recognize that in the number 770, the 7 in the hundreds place is ten times the 7 in the tens place.</i> M04.A-T.1.1.2 Read and write whole numbers in expanded, standard, and word form through 1,000,000. M04.A-T.1.1.3 Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols. M04.A-T.1.1.3 Compare two multi-digit numbers through 1,000,000 based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols.	Place value Written form Expanded form Standard form Period Compare Greater than Less than Equal Round Power of 10 Compare Digit	Quarter 1 Chapter 1 3 weeks
2.1 Numbers and Operations (B) Numbers and Operations in Base Ten	CC.2.1.4.B.2 M04.A-T.2.1 Use operations to solve problems.	M04.A-T.2.1.1 Add and subtract multi-digit whole numbers (limit sums and subtrahends up to and including 1,000,000). M04.A-T.2.1.2 Multiply a whole number of up to four digits by a one-digit whole number and multiply 2 two-digit numbers. M04.A-T.2.1.3 Divide up to four-digit dividends by one-digit divisors with answers written as whole-number quotients and remainders. M04.A-T.2.1.4 Estimate the answer to addition, subtraction, and multiplication problems using whole	Difference Sum Addend Subtract Product Factors Quotient Remainder Divisor Dividend	Quarter 1 Chapter 1 3 weeks Chapter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		numbers through six digits (for multiplication, no more than 2 digits $\times$ 1 digit, excluding powers of 10).		
2.1 Numbers and Operations (C) Numbers and Operations — Fractions	CC.2.1.4.C.1 M04.A-F.1.1 Find equivalencies and compare fractions	M04.A-F.1.1.1 Recognize and generate equivalent fractions. M04.A-F.1.1.2 Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12 and 100) using the symbols $>$, $=$, or $<$ and justify	Numerator Denominator Equivalent Compare Greater than Less than	Quarter 3 Chapter 6 2 weeks
2.1 Numbers and Operations (C) Numbers and Operations — Fractions	CC.2.1.4.C.2 M04.A-F.2.1 Solve problems involving fractions and whole numbers (straight computation or word problems).	M04.A-F.2.1.1 Add and subtract fractions with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; answers do not need to be simplified; and no improper fractions as the final answer). M04.A-F.2.1.2 Decompose a fraction or a mixed number into a sum of fractions with the same denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100), recording the decomposition by an equation. Justify decompositions (e.g., by using a visual fraction model). <i>Example 1: $\frac{3}{8} = \frac{1}{8} + \frac{1}{8} + \frac{1}{8}$ OR $\frac{3}{8} = \frac{1}{8} + \frac{2}{8}$</i> <i>Example 2: $2\frac{1}{12} = 1 + 1 + \frac{1}{12} = \frac{12}{12} + \frac{12}{12} + \frac{1}{12}$</i> M04.A-F.2.1.3 Add and subtract mixed numbers with a common denominator (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100; no regrouping with subtraction; fractions do not need to be simplified; and no improper fractions as the final answers). M04.A-F.2.1.4 Solve word problems involving addition and subtraction of fractions referring to the same whole or set and having like denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100).	Mixed numerals Improper fraction Common denominator	Quarter 3 Chapter 7 3 weeks Quarter 4 Chapter 8

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		M04.A-F.2.1.5 Multiply a whole number by a unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number). <i>Example: $5 \times (1/4) = 5/4$</i> M04.A-F.2.1.6 Multiply a whole number by a non-unit fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100 and final answers do not need to be simplified or written as a mixed number). <i>Example: $3 \times (5/6) = 15/6$</i> M04.A-F.2.1.7 Solve word problems involving multiplication of a whole number by a fraction (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100)		
2.1 Numbers and Operations (C) Numbers and Operations — Fractions	CC.2.1.4.C.3 M04.A-F.3.1 Use operations to solve problems involving decimals, including converting between fractions and decimals (may include word problems).	M04.A-F.3.1.1 Add two fractions with respective denominators 10 and 100. <i>Example: Express $3/10$ as $30/100$, and add $3/10 + 4/100 = 30/100 + 4/100 = 34/100$.</i> M04.A-F.3.1.2 Use decimal notation for fractions with denominators 10 or 100. <i>Example: Rewrite 0.62 as $62/100$ and vice versa.</i> M04.A-F.3.1.3 Compare two decimals to hundredths using the symbols $>$, $=$, or $<$, and justify the conclusions	Compare Greater than Less than Equal to Tenth Hundredth Decimal point	Quarter 3 Chapter 7 3 weeks Quarter 4 Chapter 9 3 weeks
2.2 Algebra Concepts (A) Operations and Algebraic Thinking	CC.2.2.4.A.1 M04.B-O.1.1 Use numbers and symbols to model the concepts of expressions and equations	M04.B-O.1.1.1 Interpret a multiplication equation as a comparison. Represent verbal statements of multiplicative comparisons as multiplication equations. <i>Example 1: Interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5.</i>	Equation _____times as many Variable	Quarter 2 Chapter 3: 3 weeks Chapter 4: 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		<i>Example 2: Know that the statement 24 is 3 times as many as 8 can be represented by the equation $24 = 3 \times 8$ or $24 = 8 \times 3$.</i> M04.B-O.1.1.2 Multiply or divide to solve word problems involving multiplicative comparison, distinguishing multiplicative comparison from additive comparison. <i>Example: Know that 3×4 can be used to represent that Student A has 4 objects and Student B has 3 times as many objects not just 3 more objects.</i> M04.B-O.1.1.3 Solve multi-step word problems posed with whole numbers using the four operations. Answers will be either whole numbers or have remainders that must be interpreted yielding a final answer that is a whole number. Represent these problems using equations with a symbol or letter standing for the unknown quantity. M04.B-O.1.1.4 Identify the missing symbol (+, −, ×, ÷, =, <, and >) that makes a number sentence true (single-digit divisor only).		
2.2 Algebra Concepts (A) Operations and Algebraic Thinking	CC.2.2.4.A.2 M04.B-O.2.1 Develop and apply number theory concepts to represent numbers in various ways.	M04.B-O.2.1.1 Find all factor pairs for a whole number in the interval 1 through 100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the interval 1 through 100 is a multiple of a given one- digit number.	Factors Pairs Prime Composite multiples	Quarter 3 Chapter 5 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.2 Algebra Concepts (A) Operations and Algebraic Thinking	CC.2.2.4.A.4 M04.B-0.3.1 Recognize, describe, extend, create, and replicate a variety of patterns.	M04.B-O.3.1.1 Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. <i>Example 1: Given the rule “add 3” and the starting number 1, generate terms in the resulting sequence and observe that the terms alternate between odd and even numbers.</i> <i>Example 2: Given the rule “increase the number of sides by 1” and starting with a triangle, observe that the tops of the shapes alternate between a side and a vertex.</i> M04.B-O.3.1.2 Determine the missing elements in a function table (limit to +, −, or × and to whole numbers or money). M04.B-O.3.1.3 Determine the rule for a function given a table (limit to +, −, or × and to whole numbers).	Pattern Rule Function Table	Quarter 3 Chapter 5 2 weeks Quarter 4 Chapter 10 2 weeks
2.3 Geometry (A) Geometry	CC.2.3.4.A.1 CC.2.3.4.A.2 CC.2.3.4.A.3 M04.C-G.1.1 List properties, classify, draw, and identify geometric figures in two dimensions	M04.C-G.1.1.1 Draw points, lines, line segments, rays, angles (right, acute, and obtuse), and perpendicular and parallel lines. Identify these in two dimensional figures. M04.C-G.1.1.2 Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines or the presence or absence of angles of a specified size. Recognize right triangles as a category and identify right triangles. M04.C-G.1.1.3 Recognize a line of symmetry for a two-dimensional figure as a line across the figure such that the figure can be folded along the line into mirroring parts. Identify line- symmetric figures and draw lines of symmetry (up to two lines of symmetry).	Point Line Line segment Ray Angle Right Acute Obtuse Perpendicular Parallel Two dimensional Right triangle Symmetry Line of symmetry	Quarter 4 Chapter 10 3 weeks Chapter 11 3 weeks
2.4 Measurement, Data, and Probability (A) Measurement and Data	CC.2.4.4.A.1 M04.D-M.1.1 Solve problems involving length,	M04.D-M.1.1.1 Know relative sizes of measurement units within one system of units including standard units (in., ft, yd, mi; oz., lb; and c, pt, qt, gal), metric units (cm, m, km; g, kg; and mL, L), and time (sec, min, hr, day, wk, mo,	Standard Measurement Metric Measurement Units Inches	Quarter 4 Chapter 12 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
	weight (mass), liquid volume, time, area, and perimeter	and yr). Within a single system of measurement, express measurements in a larger unit in terms of a smaller unit. A table of equivalencies will be provided. <i>Example 1: Know that 1 kg is 1,000 times as heavy as 1 g.</i> <i>Example 2: Express the length of a 4-foot snake as 48 in.</i> M04.D-M.1.1.2 Use the four operations to solve word problems involving distances, intervals of time (such as elapsed time), liquid volumes, masses of objects; money, including problems involving simple fractions or decimals; and problems that require expressing measurements given in a larger unit in terms of a smaller unit. M04.D-M.1.1.3 Apply the area and perimeter formulas for rectangles in real-world and mathematical problems (may include finding a missing side length). Whole numbers only. The formulas will be provided. M04.D-M.1.1.4 Identify time (analog or digital) as the amount of minutes before or after the hour. <i>Example 1: 2:50 is the same as 10 minutes before 3:00.</i> <i>Example 2: Quarter past six is the same as 6:15.</i>	Feet Yards Miles Pounds Ounces Tons Cup Perimeter Pint Gallon Quart Centimeter Meter Kilometer Gram Kilogram Milliliter Liter Seconds Minute Hour Quarter Past Analog Digital Day Week Month Year Elapsed time Volumes Masses Money Area Length Width	
2.4 Measurement, Data, and Probability (A) Measurement and Data	CC.2.4.4.A.2 CC.2.4.4.A.4	M04.D-M.2.1.1 Make a line plot to display a data set of measurements in fractions of a unit (e.g., intervals of $\frac{1}{2}$, $\frac{1}{4}$, or $\frac{1}{8}$).	Line Plot Table Chart	Quarter 4 Chapter 12 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
	M04.D-M.2.1 Organize, display, and answer questions based on data.	M04.D-M.2.1.2 Solve problems involving addition and subtraction of fractions by using information presented in line plots (line plots must be labeled with common denominators, such as $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$). M04.D-M.2.1.3 Translate information from one type of display to another (table, chart, bar graph, or pictograph)	Bar graph Pictograph Intervals	
2.4 Measurement, Data, and Probability (A) Measurement and Data	CC.2.4.4.A.6 M04.D-M.3.1 Use appropriate tools and units to sketch an angle and determine angle measurements	M04.D-M.3.1.1 Measure angles in whole- number degrees using a protractor. With the aid of a protractor, sketch angles of specified measures. M04.D-M.3.1.2 Solve addition and subtraction problems to find unknown angles on a diagram in real-world and mathematical problems. (Angles must be adjacent and non-overlapping.)	Angles Degrees Protractor	Quarter 4 Chapter 11 3 weeks

Fifth Grade Mathematics

Statement of Organization:

This course is designed to increase students' knowledge of numbers, mathematical concepts and their skills in operations and problem solving.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- standardized tests
- teacher-made tests
- classroom discussions
- benchmark assessments

Estimated Instructional Time: Fifth grade math classes will be instructed for a minimum of 75 min 5 days a week.

Technology Integration:

In addition to print resources, students will use technology (smart boards, laptops) when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/ Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC. 2.1.5.B.1 M05.A-T.1.1 Demonstrate understanding of place-value of whole numbers and decimals and compare quantities or magnitudes of numbers.	M05.A-T.1.1.1 (Powers of Ten) Demonstrate an understanding that in a multi-digit number, a digit in one place represents 1/10 of what it represents in the place to its left. <i>Example: Recognize that in number 770, the 7 in the tens place is 1/10 the 7 in the hundreds place.</i> M05.A-T.1.1.2 (Powers of Ten) Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole- number exponents to denote powers of 10. <i>Example 1: $4 \times 102 = 400$</i> <i>Example 2: $0.05 \div 103 = 0.00005$</i> M05.A-T.1.1.3 (Decimal Place Value) Read and write decimals to thousandths using base-ten numerals, word form, and expanded form. <i>Example: $347.392 = 300 + 40 + 7 + 0.3 + 0.09 + 0.002 = 3 \times 100 + 4 \times 10 + 7 \times 1 + 3 \times (0.1) + 9 \times (0.01) + 2 \times (0.001)$</i> M05.A-T.1.1.4 (Compare Decimals) Compare two decimals to thousandths based on meanings of the digits in each place using $>$, $=$, and $<$ symbols. M05.A-T.1.1.5 (Round Decimals) Round decimals to any place (limit rounding to ones, tenths, hundredths, or thousandths place).	Power of 10 Exponent Place value Written form Standard form Expanded form Period Decimal Compare Greater than Less than Equal Inequality Equivalent Round	5 weeks
2.1 Numbers and Operations B. Numbers and Operations in Base Ten	CC.2.1.5.B.2 M05.A-T.2.1 Use whole numbers and decimals to compute accurately (straight computation or word problems).	M05.A-T.2.1.1 Multiply multi-digit whole numbers (not to exceed three-digit by three-digit). M05.A-T.2.1.2 Find whole-number quotients of whole numbers with up to four- digit dividends and two-digit divisors. M05.A-T.2.1.3 Add, subtract, multiply, and divide decimals to hundredths (no divisors with decimals).	Factors Product Array Divisor Dividend Quotient Remainder Addend Sum	5 weeks

Big Idea/ Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
			Subtrahend Minuend Difference Expression Equation Inverse operation	
2.1 Numbers and Operations C. Numbers and Operations - Fractions	CC.2.1.5.C.1 M05.A-F.1.1 Solve addition and subtraction problems involving fractions (Straight computation or word problems).	M05.A-F.1.1.1 Add and subtract fractions (including mixed numbers) with unlike denominators. (May include multiple methods and representations.) <i>Example: $2/3 + 5/4 = 8/12 + 15/12 = 23/12$</i>	Factors Multiples Divisible Composite Prime Least Common Multiple Greatest Common Factor Numerator Denominator Equivalent Reduce Simplest Form Improper Fraction Mixed Number	3-4 weeks
2.1 Numbers and Operations C. Numbers and Operation - Fractions	CC.2.1.5.C.2 M05.A-F.2.1 Solve multiplication and division problems involving fractions and whole numbers (straight computation or word problems).	M05.A-F.2.1.1 Solve word problems involving division of whole numbers leading to answers in the form of fractions (including mixed numbers). M05.A-F.2.1.2 Multiply a fraction (including mixed numbers) by a fraction. M05.A-F.2.1.3 Demonstrate an understanding of multiplication as scaling (resizing). <i>Example 1: Comparing the size of a product to the size of one factor on the basis of the size of the other factor without performing the indicated multiplication.</i> <i>Example 2: Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a</i>	Reciprocal	2 weeks

Big Idea/ Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		<i>fraction less than 1 results in a product smaller than the given number.</i> M05.A-F.2.1.4 Divide unit fractions by whole numbers and whole numbers by unit fractions.		
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.5.A.1 M05.B-O.1.1 Analyze and complete calculations by applying the order of operations.	M05.B-O.1.1.1 Use multiple grouping symbols (parentheses, brackets, or braces) in numerical expressions and evaluate expressions containing these symbols. M05.B-O.1.1.2 Write simple expressions that model calculations with numbers and interpret numerical expressions without evaluating them. <i>Example 1: Express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$.</i> <i>Example 2: Recognize that $3 \times (18,932 + 921)$ is three times as large as $18,932 + 921$ without having to calculate the indicated sum or product.</i>	Parentheses Braces Brackets Order of Operations	3 weeks
2.2 Algebraic Concepts A. Operations and Algebraic Thinking	CC.2.2.5.A.4 M05.B-O.2.1 Create, extend, and analyze patterns.	M05.B-O.2.1.1 Generate two numerical patterns using two given rules. <i>Example: Given the rule “add 3” and the starting number 0 and given the rule “add 6” and the starting number 0, generate terms in the resulting sequences.</i> M05.B-O.2.1.2 Identify apparent relationships between corresponding terms of two patterns with the same starting numbers that follow different rules. <i>Example: Given two patterns in which the first pattern follows the rule “add 8” and the second pattern follows the rule “add 2,” observe that the terms in the first pattern are 4 times the size of the terms in the second pattern.</i>	Pattern Sequence Corresponding terms	3 weeks
2.3 Geometry A. Geometry	CC.2.3.5.A.1 M05.C-G.1.1	M05.C-G.1.1.1 Identify parts of the coordinate plane (x-axis, y-axis, and the origin) and the ordered pair (x-coordinate and y -coordinate). Limit the coordinate plane to quadrant I.	Coordinates Coordinate plane Quadrant X axis	2 weeks

Big Idea/ Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
	Identify parts of a coordinate grid and describe or interpret points given an ordered pair.	M05.C-G.1.1.2 Represent real-world and mathematical problems by plotting points in quadrant I of the coordinate plane and interpret coordinate values of points in the context of the situation.	Y axis Origin Ordered pair Plot	
2.3 Geometry A. Geometry	CC.2.3.5.A.2 M05.C-G.2.1 Use basic properties to classify two-dimensional figures.	M05.C-G.2.1.1 Classify two-dimensional figures in a hierarchy based on properties. <i>Example 1: All polygons have at least three sides, and pentagons are polygons, so all pentagons have at least three sides.</i> <i>Example 2: A rectangle is a parallelogram, which is a quadrilateral, which is a polygon; so, a rectangle can be classified as a parallelogram, as a quadrilateral, and as a polygon.</i>	Polygon Two-dimensional figure Properties Point Line Angle Side Acute Obtuse Right Triangle Isosceles triangle Scalene triangle Equilateral triangle Quadrilateral Parallelogram Trapezoid Rectangle Square Rhombus Pentagon Hexagon Pentagon Octagon Nonagon Decagon Congruent Bisect	3 weeks
2.4 Measurement, Data, and Probability A. Measurement and Data	CC.2.4.5.A.1 M05.D-M.1.1 Solve problems using simple conversions (may include multi- step, real-world problems).	M05.D-M.1.1.1 Convert between different-sized measurement units within a given measurement system. <i>A table of equivalencies will be provided. Example: Convert 5 cm to meters</i>	Convert Customary system Metric system Formula Unit	4 weeks

Big Idea/ Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
2.4 Measurement, Data, and Probability A. Measurement and Data	CC.2.4.5.A.2 CC.2.4.5.A.4 M05.D-M.2.1 Organize, display, and answer questions based on data.	M05.D-M.2.1.1 Solve problems involving computation of fractions by using information presented in line plots. M05.D-M.2.1.2 Display and interpret data shown in tallies, tables, charts, pictographs, bar graphs, and line graphs, and use a title, appropriate scale, and labels. A grid will be provided to display data on bar graphs or line graphs.	Line plot Number line Tally chart Table Pictograph Bar graph Scale Title Labels Data	5 weeks
2.4 Measurement, Data, and Probability A. Measurement and Data	CC.2.4.5.A.5 M05.D-M.3.1 Use, describe, and develop procedures to solve problems involving volume.	M05.D-M.3.1.1 Apply the formulas $V = l \times w \times h$ and $V = B \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole-number edge lengths in the context of solving real-world and mathematical problems. Formulas will be provided. M05.D-M.3.1.2 Find volumes of solid figures composed of two non-overlapping right rectangular prisms.	Volume Area Base Length Width Height Rectangular prism	3 weeks

6th Grade Mathematics

Statement of Organization:

This course is designed to serve students who have successfully completed the requirements for fifth grade mathematics. Emphasis will be placed on both pencil/paper calculations with calculators being used when deemed appropriate by the instructor. Sixth grade mathematics classes will meet daily for a minimum of sixty (60) minutes the entire school year.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed using one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- portfolios
- projects
- standardized tests
- teacher-made tests
- oral presentations
- classroom discussions
- Benchmark assessments

Estimated Instructional Time:

This course will be taught over four 9-week quarters.

Sequence:

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Numbers and Operations: The Number System	Solve real-world and mathematical problems involving division of fractions. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	Interpret and compute quotients of fractions (including mixed numbers) and solve word problems involving division of fractions by fractions.	Numerator, denominator, mixed number, improper fraction, reciprocal, counting number	M06.A-N.1.1 CC.2.1.6.E.1	Quarter 1
Numbers and Operations: The Number System	Compute multi-digit numbers using the four arithmetic operations with or without a calculator. Identify and choose appropriate processes to compute fluently with multi-digit numbers.	Solve problems involving operations (+, −, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems.	Factor, multiple, GCF, LCM, factor tree, division ladder, distributive property	M06.A-N.2.1 CC.2.1.6.E.2	Quarter 1
Numbers and Operations: The Number System	Apply number theory concepts (specifically, factors and multiples). Develop and/or apply number theory concepts to find common factors and multiples.	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.	Distributive property, greatest common factor (GCF), least common multiple (LCM)	M06.A-N.2.2 CC.2.1.6.E.3	Quarter 1
Numbers and Operations: The Number System	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values and	Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation. Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself.	Integer, rational number, irrational number, coordinate	M06.A-N.3.1 CC.2.1.6.E.4	Quarter 1

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	locations on the number line and coordinate plane. Apply and extend previous understandings of numbers to the system of rational numbers.	Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.	plane, x-axis, y-axis, ordered pair, absolute value, magnitude, negative number, positive number, opposite		
Numbers and Operations: The Number System	Understand ordering and the absolute value of rational numbers. Apply and extend previous understandings of numbers to the system of rational numbers.	Write, interpret, and explain statements of order for rational numbers in real-world contexts. Example: Write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°C . Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. Solve real-world and mathematical problems by plotting points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Additive inverse, degree (temperature)	M06.A-N.3.2 CC.2.1.6.E.4	Quarter 1
Numbers and Operations: Ratios and Proportional Relationships	Represent and/or solve real world and mathematical problems using rates, ratios, and/or percents.	Use ratio language and notation (such as 3 to 4, 3:4, 3/4) to describe a ratio relationship between two quantities. Find the unit rate a/b associated with a ratio $a:b$ (with $b \neq 0$) and use rate language in the context of a ratio relationship. Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in	Proportion, proportional relationship, rate, ratio, unit rate	M06.A-R.1.1 CC.2.1.6.D.1	Quarter 2

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Understand ratio concepts and use ratio reasoning to solve problems.	the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios. Solve unit rate problems including those involving unit pricing and constant speed. <i>Example: If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were the lawns mowed?</i> Find a percentage of a quantity as a rate per 100; solve problems involving finding the whole, given a part and the percentage.			
Algebraic Concepts: Expressions and Equations	Identify, write, and evaluate numerical and algebraic expressions. Apply and extend previous understandings of arithmetic to algebraic expressions.	Write and evaluate numerical expressions involving whole-number exponents. Write algebraic expressions from verbal descriptions. Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems. Apply the properties of operations to generate equivalent expressions.	Algebraic expression, variable, coefficient	M06.B-E.1.1 CC.2.2.6.B.1	Quarter 2
Algebraic Concepts: Expressions and Equations	Create, solve, and interpret one variable equations or inequalities in real-world and mathematical problems. Understand the process of solving a one-variable equation or inequality and	Use substitution to determine whether a given number in a specified set makes an equation or inequality true. Write algebraic expressions to represent real-world or mathematical problems. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all non-negative rational numbers.	Dependent variable, independent variable, inequality, coefficient	M06.B-E.2.1 CC.2.2.6.B.2	Quarter 2/3

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	apply to real-world and mathematical problems.	Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.			
Algebraic Concepts: Expressions and Equations	Use variables to represent two quantities in a real-world problem that change in relationship to one another. Represent and analyze quantitative relationships between dependent and independent variables.	Write an equation to express the relationship between the dependent and independent variables. Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation.	Expression	M06.B-E.3.1 CC.2.2.6.B.3	Quarter 3
Geometry: Geometry	Find area, surface area, and volume by applying formulas and using various strategies. Apply appropriate tools to solve real-world and mathematical problems involving area, surface area, and volume.	Determine the area of triangles and special quadrilaterals (i.e., square, rectangle, parallelogram, rhombus, and trapezoid). Formulas will be provided. Determine the area of irregular or compound polygons. Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided. Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon (limited to triangles and special quadrilaterals). Formulas will be provided. Represent three-dimensional figures using nets made of rectangles and triangles. Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided.	irregular polygon, net, surface area, trapezoid	M06.C-G.1.1 CC.2.3.6.A.1	Quarter 3/4

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Measurement, Data, and Probability: Statistics and Probability	Display, analyze, and summarize numerical data sets in relation to their context. Demonstrate an understanding of statistical variability by displaying, analyzing, and summarizing distributions.	Display numerical data in plots on a number line, including line plots, histograms, and box-and whisker plots. Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation). Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	Box-and-Whisker plot, combination, histogram, interquartile range, maximum, minimum, mean, median, mode, range, inner-quartile range, mean absolute deviation, measures of center, measures of central tendency, mid-range, standard deviation, permutation, quartile, stem and leaf plot	M06.D-S.1.1 CC.2.4.6.B.1	Quarter 4

6th Grade Accelerated Mathematics

Statement of Organization:

This course is designed to serve sixth-grade students who are ready to take Course I and Course II math requirements. Emphasis will be placed on both pencil/paper calculations with calculators being used when deemed appropriate by the instructor. Sixth grade mathematics classes will meet daily for a minimum of sixty (60) minutes the entire school year.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed using one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- portfolios
- projects
- standardized tests
- teacher-made tests
- oral presentations
- classroom discussions
- Benchmark assessments

Estimated Instructional Time:

This course will be taught over four 9-week quarters.

Sequence:

The Big Ideas/Reporting Categories are listed in order of delivery. Once all 6th grade curriculum is completed, students will move on to the 7th grade, Course II curriculum.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Numbers and Operations: The Number System	Solve real-world and mathematical problems involving division of fractions. Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	Interpret and compute quotients of fractions (including mixed numbers) and solve word problems involving division of fractions by fractions.	Numerator, denominator, mixed number, improper fraction, reciprocal, counting number	M06.A-N.1.1 CC.2.1.6.E.1	Quarter 1
Numbers and Operations: The Number System	Compute multi-digit numbers using the four arithmetic operations with or without a calculator. Identify and choose appropriate processes to compute fluently with multi-digit numbers.	Solve problems involving operations (+, −, ×, and ÷) with whole numbers, decimals (through thousandths), straight computation, or word problems.	Factor, multiple, GCF, LCM, factor tree, division ladder, distributive property	M06.A-N.2.1 CC.2.1.6.E.2	Quarter 1
Numbers and Operations: The Number System	Apply number theory concepts (specifically, factors and multiples). Develop and/or apply number theory concepts to find common factors and multiples.	Find the greatest common factor of two whole numbers less than or equal to 100 and the least common multiple of two whole numbers less than or equal to 12. Apply the distributive property to express a sum of two whole numbers, 1 through 100, with a common factor as a multiple of a sum of two whole numbers with no common factor.	Distributive property, greatest common factor (GCF), least common multiple (LCM)	M06.A-N.2.2 CC.2.1.6.E.3	Quarter 1
Numbers and Operations: The Number System	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values and	Represent quantities in real-world contexts using positive and negative numbers, explaining the meaning of 0 in each situation.	Integer, rational number, irrational number, coordinate	M06.A-N.3.1 CC.2.1.6.E.4	Quarter 1

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	locations on the number line and coordinate plane. Apply and extend previous understandings of numbers to the system of rational numbers.	Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., $-(-3) = 3$; 0 is its own opposite). Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.	plane, x-axis, y-axis, ordered pair, absolute value, magnitude, negative number, positive number, opposite		
Numbers and Operations: The Number System	Understand ordering and the absolute value of rational numbers. Apply and extend previous understandings of numbers to the system of rational numbers.	Write, interpret, and explain statements of order for rational numbers in real-world contexts. Interpret the absolute value of a rational number as its distance from 0 on the number line and as a magnitude for a positive or negative quantity in a real-world situation. Solve real-world and mathematical problems by plotting points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.	Additive inverse, degree (temperature)	M06.A-N.3.2 CC.2.1.6.E.4	Quarter 2
Numbers and Operations: Ratios and Proportional Relationships	Represent and/or solve real world and mathematical problems using rates, ratios, and/or percents. Understand ratio concepts and use ratio reasoning to solve problems.	Use ratio language and notation (such as 3 to 4, 3:4, $\frac{3}{4}$) to describe a ratio relationship between two quantities. Find the unit rate a/b associated with a ratio $a:b$ (with $b \neq 0$) and use rate language in the context of a ratio relationship. Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to compare ratios.	Proportion, proportional relationship, rate, ratio, unit rate	M06.A-R.1.1 CC.2.1.6.D.1	Quarter 1

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		Solve unit rate problems including those involving unit pricing and constant speed. Find a percent of a quantity as a rate per 100 solve problems involving finding the whole, given a part and the percentage.			
Algebraic Concepts: Expressions and Equations	Identify, write, and evaluate numerical and algebraic expressions. Apply and extend previous understandings of arithmetic to algebraic expressions.	Write and evaluate numerical expressions involving whole-number exponents. Write algebraic expressions from verbal descriptions. Evaluate expressions at specific values of their variables, including expressions that arise from formulas used in real-world problems. Apply the properties of operations to generate equivalent expressions.	Algebraic expression, variable, coefficient	M06.B-E.1.1 CC.2.2.6.B.1	Quarter 2
Algebraic Concepts: Expressions and Equations	Create, solve, and interpret one variable equations or inequalities in real-world and mathematical problems. Understand the process of solving a one-variable equation or inequality and apply to real-world and mathematical problems.	Use substitution to determine whether a given number in a specified set makes an equation or inequality true. Write algebraic expressions to represent real-world or mathematical problems. Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q, and x are all non-negative rational numbers. Write an inequality of the form $x > c$ or $x < c$ to represent a constraint or condition in a real-world or mathematical problem and/or represent solutions of such inequalities on number lines.	Dependent variable, independent variable, inequality, coefficient	M06.B-E.2.1 CC.2.2.6.B.2	Quarter 2

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Algebraic Concepts: Expressions and Equations	Use variables to represent two quantities in a real-world problem that change in relationship to one another. Represent and analyze quantitative relationships between dependent and independent variables.	Write an equation to express the relationship between the dependent and independent variables. Analyze the relationship between the dependent and independent variables using graphs and tables and/or relate these to an equation.	Expression	M06.B-E.3.1 CC.2.2.6.B.3	Quarter 2
Geometry: Geometry	Find area, surface area, and volume by applying formulas and using various strategies. Apply appropriate tools to solve real-world and mathematical problems involving area, surface area, and volume.	Determine the area of triangles and special quadrilaterals. Formulas will be provided. Determine the area of irregular or compound polygons. Determine the volume of right rectangular prisms with fractional edge lengths. Formulas will be provided. Given coordinates for the vertices of a polygon in the plane, use the coordinates to find side lengths and area of the polygon. Formulas will be provided. Represent three-dimensional figures using nets made of rectangles and triangles. Determine the surface area of triangular and rectangular prisms (including cubes). Formulas will be provided.	irregular polygon, net, surface area, trapezoid	M06.C-G.1.1 CC.2.3.6.A.1	Quarter 3
Measurement, Data, and Probability: Statistics and Probability	Display, analyze, and summarize numerical data sets in relation to their context. Demonstrate an understanding of statistical	Display numerical data in plots on a number line, including line plots, histograms, and box-and whisker plots. Determine quantitative measures of center (e.g., median, mean, mode) and variability (e.g., range, interquartile range, mean absolute deviation).	Box-and-Whisker plot, combination, histogram, interquartile range, maximum,	M06.D-S.1.1 CC.2.4.6.B.1	Quarter 3/4

Big Idea / Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	variability by displaying, analyzing, and summarizing distributions.	Describe any overall pattern and any deviations from the overall pattern with reference to the context in which the data were gathered. Relate the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.	minimum, mean, median, mode, range, inner-quartile range, mean absolute deviation, measures of center, measures of central tendency, mid-range, standard deviation, permutation, quartile, stem and leaf plot		

7th Grade Mathematics

Statement of Organization:

This course is designed to serve students who have successfully completed the requirements for sixth grade mathematics. Emphasis will be placed on both pencil/paper calculations and the use of calculators. Seventh grade mathematics classes will meet daily for a minimum of sixty (60) minutes the entire school year.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven (77%) on all forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- projects
- standardized tests
- teacher-made tests
- performance tasks
- math journal/notebook
- oral presentations
- classroom discussions

Estimated Instructional Time:

Seventh grade mathematics classes will meet five days a week for sixty minutes. Each of the four marking periods will be nine weeks in duration.

Sequence

The reporting categories will be taught in the following order: Expressions and Equations, The Number System, Geometry, Ratios and Proportional Relationships, Statistics and Probability.

Technology Integration:

In addition to print resources, students will use technology. Calculators will be available daily and used when deemed appropriate by the instructor. With the one-to-one technology provided by students' Chromebooks, online programs will be utilized during each unit of study for additional practice. IXL will allow the students an opportunity to practice for standardized tests.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Expressions and Equations	Apply properties of operations to generate equivalent expressions. Use properties of operations to generate equivalent expressions.	Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients.	Algebraic Expression Coefficient Constant Distributive Property Equations Evaluate Expression Factor Inequality Like Terms Linear Equation Negative Numerical Expression Opposite Positive Variable	CC.2.2.7.B.1 M07.B-E.1.1.1	Marking Period 1
Expressions and Equations	Model and solve real-world and mathematical problems by using the connecting numerical, algebraic, and/or graphical representations. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers.	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate.		CC.2.2.7.B.3 M07.B-E.2.1.1	Marking Period 1
Expressions and Equations	Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers.		CC.2.2.7.B.3 M07.B-E.2.2.1 M07.B-E.2.2.2	Marking Period 1

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems.	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers, and graph the solution set of the inequality.			
Expressions and Equations	Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. Determine the reasonableness of the answer(s) in problem-solving situations.	Determine the reasonableness of an answer(s), or interpret the solution(s) in the context of the problem.		CC.2.2.7.B.3 M07.B-E.2.3.1	Marking Period 1
The Number System	Apply and extend previous understandings of operations with fractions to operations with rational numbers. Solve real-world and mathematical problems involving the four operations with rational numbers.	Apply properties of operations to add and subtract rational numbers, including real-world contexts. Represent addition and subtraction on a horizontal or vertical number line. Apply properties of operations to multiply and divide rational numbers, including real-world contexts, demonstrate that the decimal form of a rational number terminates or eventually repeats.	Absolute value Additive Inverse Associative Property Base Commutative Property Composite Number Cube Root Denominator Difference Equivalent Exponent Factor Greatest Common Factor Identity Property	CC.2.1.7.E.1 M07.A-N.1.1.1 M07.A-N.1.1.2 M07.A-N.1.1.3	Marking Period 2

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Improper Fraction Integer Irrational Number Least Common Multiple Mixed Number Multiples Numerator Opposite Perfect Square Prime Number Product Quotient Rational Number Repeating Decimal Simplify Square Root Sum Terminating Decimal Whole Number		
Geometry	Visualize and represent geometric figures and describe the relationships between them. Describe and apply properties of geometric figures.	Solve problems involving scale drawings of geometric figures, including finding length and area. Identify or describe the properties of all types of triangles based on angle and side measure. Use and apply the triangle inequality theorem. Describe the two-dimensional figures that result from slicing three-dimensional figures.	Area Chord Circumference Composite/Irregular Congruent Corresponding Sides Cross Section Figure Diameter Parallelogram Perimeter Prism	CC.2.3.7.A.2 M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4	Marking Period 2

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Quadrilateral Radius Rhombus Scale Drawing Scale Factor Square Surface Area Trapezoid Volume		
Geometry	Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume. Determine circumference, area, surface area, and volume.	Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.		CC.2.3.7.A.1 M07.C-G.2.2.1 M07.C-G.2.2.2	Marking Period 2/3
Geometry	Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume. Identify, use and describe properties of angles and their measures.	Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior alternate exterior, vertical, corresponding).	Acute Adjacent Angles Alternate Exterior Angles Alternate Interior Angles Complementary Angles Congruent Corresponding Angles Equilateral Face Irregular Polygon Isosceles Line	CC.2.3.7.A.1 M07.C-Q.2.1.1 M07.C-G.2.1.2	Marking Period 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Line Segment Net Obtuse Parallel Perpendicular Plane Pyramid Right Supplementary Angles Transversal Vertical Angles		
Ratios and Proportional Relationships	Analyze proportional relationships and use them to model and solve real-world and mathematical problems. Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measure in like or different units. Determine whether two quantities are proportionally related (e.g. by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. Represent proportional relationships by equations. Explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation, with special	Commission Constant Constant of Proportionality Coordinate Plane Equivalent Gratuities Ordered Pair Origin Non-Proportional Percent of Change Percent of Decrease Percent of Increase Proportion Proportional Quadrant Rate Ratio Simple Interest Slope Unit Price Unit Rate X-Axis	CC.2.1.7.D.1 M07.A-R.1.1.1 M07.A-R.1.1.2 M07.A-R.1.1.3 M07.A-R.1.1.4 M07.A-R.1.1.5 M07.A-R.1.1.6	Marking Period 3/4

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		attention to the points (0,0) and (1, r) where r is the unit rate. Use proportional relationships to solve multi-step ratio and percent problems.	Y-Axis		
Statistics and Probability	Draw inferences about populations based on random sampling concepts. Use random samples.	Determine whether a sample is a random sample given a real-world situation. Use data from a random sample to draw inferences about a population with an unknown characteristic of interest.	Inference Population Random Sample	CC.2.4.6.B.1 M07.D-S.1.1.1 M07.D-S.1.1.2	Marking Period 4
Statistics and Probability	Draw informal comparative inferences about two populations. Use statistical measures to compare two numerical data distributions.	Compare two numerical data distributions using measures of center and variability.	Minimum Maximum Mean Median Mode Range Upper Quartile Lower Quartile Inner Quartile Range Measure of Center Measure of Variability Outlier	CC.2.4.7.B.2 M07.D-S.2.1.1	Marking Period 4
Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models. Predict or determine the likelihood of outcomes.	Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible. Determine the probability of a chance event given relative frequency. Predict	Chance Event Compound Event Dependent Events Equally Likely Experimental Probability Independent Events	CC.2.4.7.B.3 M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2	Marking Period 4

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Use probability to predict outcomes.	the approximate relative frequency given the probability. Find the probability of a simple event, including the probability of a simple event, not occurring. Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.	Likely Event Outcome Probability Relative Frequency Simple Event Theoretical Probability Unlikely Event	M07.D-S.3.2.3	

7th Grade Accelerated Mathematics

Statement of Organization:

This course is designed to serve students who have successfully completed the requirements for sixth grade mathematics. Emphasis will be placed on both pencil/paper calculations and the use of calculators. Seventh grade mathematics classes will meet daily for a minimum of sixty (60) minutes the entire school year.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven (77%) on all forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- projects
- standardized tests
- teacher-made tests
- performance tasks
- math journal/notebook
- oral presentations
- classroom discussions

Estimated Instructional Time:

Seventh grade mathematics classes will meet five days a week for sixty minutes. Each of the four marking periods will be nine weeks in duration.

Sequence

The reporting categories will be taught in the following order: Expressions and Equations, The Number System, Geometry, Ratios and Proportional Relationships, Statistics and Probability. The delivery of concepts will be at an accelerated pace. Once all seventh grade curriculum has been completed, students will move into the eighth grade curriculum.

Technology Integration:

In addition to print resources, students will use technology. Calculators will be available daily and used when deemed appropriate by the instructor. With the one-to-one technology provided by students' Chromebooks, online programs will be utilized during each unit of study for additional practice. IXL will allow the students an opportunity to practice for standardized tests.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Expressions and Equations	Apply properties of operations to generate equivalent expressions. Use properties of operations to generate equivalent expressions.	Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients.	Algebraic Expression Coefficient Constant Distributive Property Equations Evaluate Expression Factor Inequality Like Terms Linear Equation Negative Numerical Expression Opposite Positive Variable	CC.2.2.7.B.1 M07.B-E.1.1.1	Marking Period 1
Expressions and Equations	Model and solve real-world and mathematical problems by using the connecting numerical, algebraic, and/or graphical representations. Solve multi-step real-life and mathematical problems posed with positive and negative rational numbers.	Apply properties of operations to calculate with numbers in any form, convert between forms as appropriate.		CC.2.2.7.B.3 M07.B-E.2.1.1	Marking Period 1
Expressions and Equations	Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.	Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers.		CC.2.2.7.B.3 M07.B-E.2.2.1 M07.B-E.2.2.2	Marking Period 1

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems.	Solve word problems leading to inequalities of the form $px + q > r$ or $px + q < r$, where p , q , and r are specific rational numbers, and graph the solution set of the inequality.			
Expressions and Equations	Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations. Determine the reasonableness of the answer(s) in problem-solving situations.	Determine the reasonableness of an answer(s), or interpret the solution(s) in the context of the problem.		CC.2.2.7.B.3 M07.B-E.2.3.1	Marking Period 1
Expressions and Equations	Apply concepts of radicals and integer exponents to generate equivalent expressions. Represent and use expressions and equations to solve problems involving radicals and integer exponents.	Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator.	Base Cube Cube Root Exponent Power Square Square Root	CC.2.2.8.B.1 M08.B-E.1.1.1	Marking Period 1
Expressions and Equations	Analyze and solve linear equations and pairs of simultaneous linear equations.	Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into	Infinite Solutions No Solutions One Solution Ordered Pair Substitution	CC.22.8.B.3 M08.B-E.3.1.1 M08.B-E.3.1.2	Marking Period 1

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Write, solve, graph, and interpret linear equations in one or two variables, using various methods.	simpler forms until an equivalent equation of the form $x = a$, $a = a$, or $a = b$. Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.			
The Number System	Apply and extend previous understandings of operations with fractions to operations with rational numbers. Solve real-world and mathematical problems involving the four operations with rational numbers.	Apply properties of operations to add and subtract rational numbers, including real-world contexts. Represent addition and subtraction on a horizontal or vertical number line. Apply properties of operations to multiply and divide rational numbers, including real-world contexts, demonstrate that the decimal form of a rational number terminates or eventually repeats.	Absolute value Additive Inverse Associative Property Base Commutative Property Composite Number Cube Root Denominator Difference Equivalent Exponent Factor Greatest Common Factor Identity Property Improper Fraction Integer Irrational Number Least Common Multiple Mixed Number Multiples Numerator	CC.2.1.7.E.1 M07.A-N.1.1.1 M07.A-N.1.1.2 M07.A-N.1.1.3	Marking Period 2

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Opposite Perfect Square Prime Number Product Quotient Rational Number Repeating Decimal Simplify Square Root Sum Terminating Decimal Whole Number		
The Number System	Distinguish between rational and irrational numbers using their properties. Apply concepts of rational and irrational numbers.	Determine whether a number is rational or irrational. For rational numbers, show that the decimal expansion terminates or repeats. Convert a terminating or repeating decimal to a rational number (limit repeating decimals to thousandths). Locate/identify rational and irrational numbers at their approximate locations on a number line.	Natural Numbers Real Numbers	CC.2.1.8.E.1 M08.A-N.1.1.1 M08.A-N.1.1.2 M08.A-N.1.1.5	Marking Period 2
Geometry	Visualize and represent geometric figures and describe the relationships between them. Describe and apply properties of geometric figures.	Solve problems involving scale drawings of geometric figures, including finding length and area. Identify or describe the properties of all types of triangles based on angle and side measure. Use and apply the triangle inequality theorem.	Area Chord Circumference Composite/Irregular Congruent Corresponding Sides Cross Section Figure	CC.2.3.7.A.2 M07.C-G.1.1.1 M07.C-G.1.1.2 M07.C-G.1.1.3 M07.C-G.1.1.4	Marking Period 2

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		Describe the two-dimensional figures that result from slicing three-dimensional figures.	Diameter Parallelogram Perimeter Pi Prism Quadrilateral Radius Rhombus Scale Drawing Scale Factor Square Surface Area Trapezoid Volume		
Geometry	Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume. Determine circumference, area, surface area, and volume.	Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Solve real-world and mathematical problems involving area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.		CC.2.3.7.A.1 M07.C-G.2.2.1 M07.C-G.2.2.2	Marking Period 3
Geometry	Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume. Identify, use and describe properties of angles and their measures.	Identify and use properties of supplementary, complementary, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior alternate exterior, vertical, corresponding).	Acute Adjacent Angles Alternate Exterior Angles Alternate Interior Angles Complementary Angles Congruent Corresponding Angles	CC.2.3.7.A.1 M07.C-Q.2.1.1 M07.C-G.2.1.2	Marking Period 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Equilateral Face Irregular Polygon Isosceles Line Line Segment Net Obtuse Parallel Perpendicular Plane Pyramid Right Supplementary Angles Transversal Vertical Angles		
Ratios and Proportional Relationships	Analyze proportional relationships and use them to model and solve real-world and mathematical problems. Analyze, recognize, and represent proportional relationships and use them to solve real-world and mathematical problems.	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measure in like or different units. Determine whether two quantities are proportionally related (e.g. by testing for equivalent ratios in a table, or graphing on a coordinate plane and observing whether the graph is a straight line through the origin). Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.	Commission Constant Constant of Proportionality Coordinate Plane Equivalent Gratuities Ordered Pair Origin Non-Proportional Percent of Change Percent of Decrease Percent of Increase Proportion Proportional Quadrant Rate Ratio	CC.2.1.7.D.1 M07.A-R.1.1.1 M07.A-R.1.1.2 M07.A-R.1.1.3 M07.A-R.1.1.4 M07.A-R.1.1.5 M07.A-R.1.1.6	Marking Period 3/4

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		Represent proportional relationships by equations. Explain what a point (x,y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0,0) and (1, r) where r is the unit rate. Use proportional relationships to solve multi-step ratio and percent problems.	Simple Interest Slope Unit Price Unit Rate X-Axis Y-Axis		
Statistics and Probability	Draw inferences about populations based on random sampling concepts. Use random samples.	Determine whether a sample is a random sample given a real-world situation. Use data from a random sample to draw inferences about a populations with an unknown characteristic of interest.	Inference Population Random Sample	CC.2.4.6.B.1 M07.D-S.1.1.1 M07.D-S.1.1.2	Marking Period 4
Statistics and Probability	Draw informal comparative inferences about two populations. Use statistical measures to compare two numerical data distributions.	Compare two numerical data distributions using measures of center and variability.	Minimum Maximum Mean Median Mode Range Upper Quartile Lower Quartile Inner Quartile Range Measure of Center Measure of Variability Outlier	CC.2.4.7.B.2 M07.D-S.2.1.1	Marking Period 4

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Statistics and Probability	Investigate chance processes and develop, use, and evaluate probability models. Predict or determine the likelihood of outcomes. Use probability to predict outcomes.	Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible. Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. Find the probability of a simple event, including the probability of a simple event, not occurring. Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation.	Chance Event Compound Event Dependent Events Equally Likely Experimental Probability Independent Events Likely Event Outcome Probability Relative Frequency Simple Event Theoretical Probability Unlikely Event	CC.2.4.7.B.3 M07.D-S.3.1.1 M07.D-S.3.2.1 M07.D-S.3.2.2 M07.D-S.3.2.3	Marking Period 4

8th Grade Mathematics

Statement of Organization:

This course is designed to provide students with the basic knowledge and skills necessary for success in Algebra I. It gives students a sense of some key areas of introductory algebra while maintaining basic mathematical skills. Calculators will be used for all classes with due consideration given to the complexity of the activity, conservation of time, and understanding of basic operations. As students progress through the course, calculator applications will be taught, and their use will increase. Classes will meet daily for at least sixty (60) minutes the entire school year.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy-seven (77%) on all forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Drill and practice
- Demonstration
- Teacher observation
- Projects
- Standardized tests
- Teacher-made tests
- Performance tasks
- Math journal/notebook
- Oral presentations
- Classroom discussions

Estimated Instructional Time:

The 8th grade will meet five days a week for sixty minutes. Standards are broken into 9-week sections.

Sequence

The reporting categories will be taught in the following order: The Number System, Expressions and Equations, Functions, Geometry, and Statistics and Probability.

Technology Integration:

In addition to print resources, students will use technology. Calculators will be available daily and used when deemed appropriate by the instructor. With the one-to-one technology provided by students' Chromebooks, online programs will be utilized during each unit of study for additional practice. IXL will allow the students an opportunity to practice for standardized tests.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
The Number System	Apply concepts of rational and irrational numbers. Distinguish between rational and irrational numbers using their properties. Estimate irrational numbers by comparing them to rational numbers.	M08.A-N.1.1.1 - Determine whether a number is rational or irrational. M08.A-N.1.1.2 - Convert a terminating or repeating decimal into a rational number. M08.A-N.1.1.3 - Estimate the value of irrational numbers without a calculator M08.A-N.1.1.4 - Use rational approximations of irrational numbers to compare and order irrational numbers. M08.A-N.1.1.5 - Locate / identify rational and irrational numbers at their approximate locations on a number line.	Real Numbers Rational Irrational Integer Whole Natural Perfect Squares Square Roots Perfect Cubes Cube Root	M08.A-N.1.1 CC.2.1.8.E.1 CC.2.1.8.E.4	Marking Period 1
Expressions and Equations	Represent and use expressions and equations to solve problems involving radicals and integer exponents. Apply concepts of radicals and integer exponents to generate equivalent expressions.	M08.B-E.1.1.1 - Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator. M08.B-E.1.1.2 - Evaluate square roots of perfect squares and cube roots of perfect cubes without a calculator. M08.B-E.1.1.3 - Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10, and express how many times larger or smaller one number is than another.	Radicals Radicand Perfect Squares Square Roots Perfect Cubes Cube Roots Scientific Notation	M08.B-E.1.1 CC.2.2.8.B.1	Marking Period 1

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		M08-B-E.1.1.4 - Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used			
Expressions and Equations	Write, solve, graph, and interpret linear equations in one or two variables, using various methods. Analyze and solve linear equations and pairs of simultaneous linear equations.	M08.B-E.3.1.1 – Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solution. Show which of these possibilities is the case by successfully transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). M08.B-E.3.1.2 – Solve linear equations that have rational numbers coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	Infinite Solutions Rational Coefficients	M08.B-E.3.1 CC.2.2.8.B.3	Marking Period 2
Expressions and Equations	Analyze and describe linear relationships between two variables, using slope. Understand the connections between proportional relationships, lines and linear equations	M08.B-E.2.1.1 - Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationship represented in different ways. M08.B-E.2.1.2 – Use similar triangles to show and explain why the slope (m) is the same between any two distinct points on a non-vertical line in the coordinate plane.	Slope Rate of Change Similar Triangles Y-intercept	M08.B-E.2.1 CC.2.2.8.B.2	Marking Period 2

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		M08.B-E.2.1.3 – Derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b .			
Functions	Define, evaluate, and compare functions displayed algebraically, graphically, numerically in tables, or by verbal descriptions. Define, evaluate, and compare functions.	M08.B-F.1.1.1 – Determine whether a relation is a function. M08.B-F.1.1.2 – Compare properties of two functions each represented in different ways (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions.) M08.B-F.1.1.3 – Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear	Relations Functions Vertical Line Test Linear Non-Linear	M08.B-F.1.1 CC.2.2.8.C.1	Marking Period 2
Functions	Define, evaluate, and compare functions displayed algebraically, graphically, numerically in tables, or by verbal descriptions. Define, evaluate, and compare functions.	M08.B-F.1.1.3 – Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear.	Non-Linear Linear	M08.B-F.1.1 CC.2.2.8.C.1	Marking Period 3
Expressions and Equations	Write, solve, graph and interpret linear equations in one or two variables, using various methods. Analyze and solve linear equations and pairs of	M08.B-E.3.1.3 – Interpret solutions to a system of two linear equations in two variables as points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	Simultaneous Linear Equations	M08.B-E.3.1 CC.2.2.8.B.3	Marking Period 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	simultaneous linear equations.	M08.B-E.3.14 – Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection. M08.B-E-3.1.5 – Solve real-world and mathematical problems leading to two linear equations in two variables.			
Functions	Represent or interpret functional relationships between quantities using tables, graphs, and descriptions. Use concepts of functions to model relationships between quantities	M08.B-F.2.1.1 – Construct a function to model linear relationships between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values. M08.B-F.2.1.2 – Describe qualitatively the functional relationship between two quantities by analyzing a graph. Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.).		M08.B-F.2.1 CC.2.2.8.C.2	Marking Period 3
Geometry	Solve problems involving right triangles by applying the Pythagorean Theorem. Understand and apply the Pythagorean Theorem to solve problems.	M08.C-G.2.1.1 – Apply the converse of the Pythagorean theorem to show a triangle is a right triangle. M08.C-G.2.1.2 – Apply the Pythagorean theorem to determine unknown side lengths in right triangles in real-world and mathematical	Converse Hypotenuse Pythagorean Theorem	M08.C-G.2.1 CC.2.3.8.A.3	Marking Period 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		problems in two and three dimensions. M08.C- G.2.1.3 – Apply the Pythagorean theorem to find the distance between two points in a coordinate system.	Square root		
Statistics and Probability	Analyze and interpret bivariate data displayed in multiple representations. Analyze and/or interpret bivariate data displayed in multiple representations. Understand that patterns of association can be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Understand that patterns of association can be seen in bivariate data utilizing frequencies	M08.D-S.1.1.1 - Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association. M08.D-S.1.1.2 - For scatter plots that suggest a linear association, identify a line of best fit by judging the closeness of the data points to the line. M08.D0S.1.1.3 - Use the equation of linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. M08.D-S.1.2.1 - Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible associations between the two variables.	Bivariate Data Clustering Correlation Negative Correlation Positive Correlation Line of Best Fit Linear Association Non-Linear Association Outlier Scatterplot Two-way table	M08.D-S.1.1 CC.2.4.8.B.1 M08-D-S.1.2 CC.2.4.8.B.2	Marking Period 3

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Geometry	Apply volume formulas of cones, cylinders, and spheres. Apply the concepts of volumes of cylinders, cones, and spheres to solve real-world and mathematical problems.	M08.C-G.3.1.1 – Apply formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems. Formulas will be provided.	Cones Cube root Cylinders Spheres Square root	M08.C-G.3.1 CC. 2.3.8.A.1	Marking Period 4
Geometry	Apply properties of geometric transformations to verify congruence or similarity. Understand and apply congruence, similarity, and geometric transformations using various tools.	M08.C-G.1.1.1 – Identify and apply properties of rotations, reflections, and transformations. M08.C-G.1.1.2 – Given two congruent figures, describe a sequence of transformation that exhibits the congruence between them. M08.C-G.1.1.3 – Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures, using coordinates. M08.C-G.1.1.4 – Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.	Congruence Congruent Figures Dilations Reflections Rotations Similarity Transformations Translation	M08.C-G.1.1 CC.2.3.8.A.2	Marking Period 4

Comprehensive Algebra I

Statement of Organization:

This course is open to students in grade nine who have successfully completed foundation work in general mathematics and Pre-Algebra with a seventy percent or higher. Students should take this course prior to Geometry. Algebra I is designed to prepare students for success in higher mathematics courses and other related courses.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy percent (70%) on all forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Drill and practice
- Demonstration
- Teacher observation
- Projects
- Standardized tests
- Teacher made assessments
- Classroom discussions
- Performance tasks

Estimated Instructional Time:

This course meets every day for eighty minutes. Each of the four quarters is nine weeks of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology. Calculators will be available daily. Chromebooks will be utilized for online programs and teacher generated practice via google classroom. DeltaMath will be utilized to give students additional practice.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Operations with Real Numbers and expressions	Distinguish between rational and irrational numbers using their properties. Estimate irrational numbers by comparing them to rational numbers. Apply properties of rational and irrational numbers to solve real world or mathematical problems.	Compare and/or order any real numbers (Rational and irrational may be mixed) Use estimation to solve problems.	Real Natural Whole Integer Rational Irrational Commutative Property Associative Property Identity Property Inverse Property Property of Zero Distributive Property Reflexive Property Symmetric Property Transitive Property Substitution Square Root Radical Absolute Value Repeating Decimal Terminating Decimal Simplify Numeric Expression Algebraic Expression Evaluate	CC.2.1.8.E.1 CC.2.1.8.E.4. CC.2.1.HS.F.2 A1.1.1.1.1 A1.1.1.4.1	Quarter 1 2 weeks
Linear Equations	Apply inverse operations to solve equations or formulas for a given variable.	Write, solve, and/or apply a linear equation (including problem situations).	Cross Products Equivalent Fractions Formula	CC.2.1.HS.F.4 CC.2.2.HS.D.8 CC.2.2.HS.D.9	Quarter 1 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Represent, solve and interpret equations/inequalities. Use reasoning to solve equations and justify the solution method.	Use and/or identify an algebraic property to justify any step in an equation solving process. Note: Linear equations only. Interpret solutions to problems in the context of the problem situation. Note: Linear equations only. Use estimation to solve problems.	Inverse Operations Literal Equation Percent change Proportion Rate Ratio Scale Unit analysis	CC.2.2.HS.D.1 0 A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3 A1.1.1.4.1	
Linear Inequalities	Create and graph equations or inequalities to describe numbers or relationships. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). Identify or graph the solution set to a linear inequality on a number line. Interpret solutions to problems in the context of the problem situation. Note: Limit to linear inequalities.	Compound inequality Equivalent inequalities Intersection Interval notation Solution of an inequality Boundary line Test point	CC.2.2.HS.D.7 CC.2.2.HS.D.1 0 CC.2.1.HS.F.5 A1.1.3.1.1 A1.1.3.1.2 A1.1.3.1.3	Quarter 1 3 weeks
Functions	Understand the connections between proportional relationships, lines, and linear equations.	Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. Determine whether a relation is a	Arithmetic sequence Continuous graph Dependent variable Domain Explicit formula	CC.2.2.8.B.2 CC.2.4.HS.B.2 CC.2.1.HS.F.3 CC.2.2.HS.C.3 CC.2.1.HS.F.4 CC.2.2.HS.C.2	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Summarize, represent, and interpret data on two categorical and quantitative variables. Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Write functions or sequences that model relationships between two quantities. Use units as a way to understand problems and to guide the solution of multi-step problems. Graph and analyze functions and use their properties to make connections between different representations. Interpret the effects transformations have on functions. Interpret functions in terms of situations they model.	function, given a set of points or a graph. Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Create, interpret, and/or use the equation, graph, or table of a linear function. Translate from one representation of a linear function to another (i.e., graph, table, and equation).	Function Function notation Input Independent variable Linear function Nonlinear function Output Range Relation Vertical line test Maximum and minimum value Quadrants Relation	CC.2.2.HS.C.4 CC.2.2.HS.C.6 A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3 A1.2.1.2.1 A1.2.1.2.2	

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Coordinate Geometry	Define, evaluate, and compare functions. Use concepts of functions to model relationships between quantities. Use the concept and notation of functions to interpret and apply them in terms of their context. Write functions or sequences that model relationships between two quantities. Construct and compare linear, quadratic, and/or exponential models to solve problems. Summarize, represent, and interpret data on two categorical and quantitative variables. Analyze linear models to make interpretations based on the data. Interpret functions in terms of the situation they model.	Identify, describe, and/or use constant rates of change. Apply the concept of linear rate of change (slope) to solve problems. Write or identify a linear equation when given • the graph of the line, • two points on the line, or • the slope and a point on the line. Note: Linear equation may be in point-slope, standard, and/or slope-intercept form. Determine the slope and/or y-intercept represented by a linear equation or graph. Draw, identify, find and/or write an equation for a line of best fit for a scatter plot.	Direct variation Absolute value function Linear equation Line of best fit Negative correlation No correlation Opposite reciprocal Rate of change Scatter plot Parallel lines Perpendicular lines Point-slope form Positive correlation Slope Slope-intercept form Standard form Trend line X-intercept Y-intercept	CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 C.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.4.HS.B.2 CC.2.4.HS.B.3 CC.2.2.HS.C.6 A1.2.2.1.1 A1.2.2.1.2 A1.2.2.1.3 A1.2.2.1.4 A1.2.2.2.1	Quarter 2 5 weeks
Data Analysis	Analyze linear models to	Make predictions using the equations	Line of best fit Negative correlation	CC.2.4.HS.B.3	Quarter 2 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	make interpretations based on the data.	or graphs of best-fit lines of scatter plots.	No correlation Scatter plot Positive correlation	A1.2.3.2.3	
Linear Equations	Analyze and solve linear equations and pairs of simultaneous linear equations. Use reasoning to solve equations and justify the solution. Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write and/or solve a system of linear equations using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations. Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations.	Consistent Dependent Elimination method Inconsistent Independent Solution to a system of linear equations Substitution method System of linear equations	CC.2.2.8.B.3 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.2.2.1 A1.1.2.2.2	Quarter 3 2 weeks
Linear Inequalities	Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities. Interpret solutions to problems in the context of the problem situation.	Linear inequality Solution to a linear inequality Solution to a system of linear inequalities	CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.3.2.1 A1.1.3.2.2	Quarter 3 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Note: Limit systems to two linear inequalities.	System of linear inequalities		
Operations with Real Numbers and Expressions	Develop and/or apply number theory concepts to find common factors and multiples. Apply and extend the properties of exponents to solve problems with rational exponents. Apply properties of rational and irrational numbers to solve real world or mathematical problems. Apply concepts of radicals and integer exponents to generate equivalent expressions. Interpret the structure of expressions to represent a quantity in terms of its context. Write expressions in equivalent forms to solve	Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials. Simplify/evaluate expressions involving properties/laws of exponents, roots, and/ or absolute values to solve problems. Note: Exponents should be integers from - 10 to 10. Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial. Factor algebraic expressions, including differences of squares and trinomials. Note: Trinomials are limited to the form ax^2+bx+c where a is equal to 1 after factoring out all monomial factors.	Exponential function Negative exponent Positive exponents Monomial, binomial, trinomial, polynomial Degree of a polynomial Difference of two squares Factor by grouping Perfect-square trinomial Standard form of a polynomial Factor Composite number Prime number	CC.2.1.6.E.3 CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.2.8.B.1 CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 A1.1.1.2.1 A1.1.1.3.1 A1.1.1.5.1 A1.1.1.5.2	Quarter 3 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	problems. Extend the knowledge of arithmetic operations and apply to polynomials. Use polynomial identities to solve problems.				
Operations with Real Numbers and Expressions	Extend the knowledge of rational functions to rewrite in equivalent forms. Apply and extend properties of exponents to solve problems with rational exponents. Apply properties of rational and irrational numbers to solve real world or mathematical problems.	Simplify/reduce a rational algebraic expression Simplify square roots.	Rational equation Rational expression Rational function Hypotenuse Leg Like radicals Pythagorean Theorem Radical equation Radical expression Square root function Unlike radicals	CC.2.2.HS.D.6 CC.2.1.HS.F.1 CC.2.1.HS.F.2 A1.1.1.5.3 A1.1.1.1.2	Quarter 4 2 weeks
Data Analysis	Summarize, represent, and interpret data on a single count or measurement variable. Analyze linear models to make interpretations based on the data.	Calculate and/or interpret the range, quartiles, and interquartile range of data. Estimate or calculate predictions based on a circle, line, bar graph, measures of central tendency, or other representations. Analyze data, make predictions,	Compound event Dependent events Frequency Histogram Independent events Interquartile range Measure of central tendency Outcome Outlier	CC.2.4.HS.B.1 CC.2.4.HS.B.3 CC.2.4.HS.B.4 CC.2.4.HS.B.5 CC.2.4.HS.B.7 A1.2.3.1.1 A1.2.3.2.1 A1.2.3.2.2 A1.2.3.2.3	Quarter 4 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Recognize and evaluate random processes underlying statistical experiments. Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. Apply the rules of probability to compute probabilities of compound events in a uniform probability model.	and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations). Make predictions using the equations or graphs of best-fit lines of scatter plots. Find probability for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent.	Percentile Permutation Probability Quartile Range Sample Bar graph Circle graph Measure of dispersion Odds	A1.2.3.3.1	

Algebra I

Statement of Organization:

This course is open to students from grades eight to ten who have successfully completed foundation work in general mathematics and Pre-Algebra with a seventy percent or higher. Students should take this course prior to Geometry. Algebra I meets for a minimum of one hundred twenty clock hours and designed to prepare students for success in higher mathematics courses and other related courses.

Expected Levels of Achievement:

Students are expected to master the objectives taught by achieving at least seventy percent (70%) on all forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Drill and practice
- Demonstration
- Teacher observation
- Projects
- Standardized tests
- Teacher made assessments
- Classroom discussions
- Performance tasks

Estimated Instructional Time:

High school courses meet every other day for eighty minutes. Each of the four quarters is nine weeks of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology. Calculators will be available daily. Chromebooks will be utilized for online programs and teacher generated practice via google classroom. DeltaMath will be utilized to give students additional practice.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Operations with Real Numbers and expressions	Distinguish between rational and irrational numbers using their properties. Estimate irrational numbers by comparing them to rational numbers. Apply properties of rational and irrational numbers to solve real world or mathematical problems.	Compare and/or order any real numbers (Rational and irrational may be mixed) Use estimation to solve problems.	Real Natural Whole Integer Rational Irrational Commutative Property Associative Property Identity Property Inverse Property Property of Zero Distributive Property Reflexive Property Symmetric Property Transitive Property Substitution Square Root Radical Absolute Value Repeating Decimal Terminating Decimal Simplify Numeric Expression Algebraic Expression Evaluate	CC.2.1.8.E.1 CC.2.1.8.E.4. CC.2.1.HS.F.2 A1.1.1.1.1 A1.1.1.4.1	Quarter 1 2 weeks
Linear Equations	Apply inverse operations to solve equations or formulas for a given variable.	Write, solve, and/or apply a linear equation (including problem situations).	Cross Products Equivalent Fractions Formula	CC.2.1.HS.F.4 CC.2.2.HS.D.8 CC.2.2.HS.D.9	Quarter 1 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Represent, solve and interpret equations/inequalities. Use reasoning to solve equations and justify the solution method.	Use and/or identify an algebraic property to justify any step in an equation solving process. Note: Linear equations only. Interpret solutions to problems in the context of the problem situation. Note: Linear equations only. Use estimation to solve problems.	Inverse Operations Literal Equation Percent change Proportion Rate Ratio Scale Unit analysis	CC.2.2.HS.D.1 0 A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3 A1.1.1.4.1	
Linear Inequalities	Create and graph equations or inequalities to describe numbers or relationships. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). Identify or graph the solution set to a linear inequality on a number line. Interpret solutions to problems in the context of the problem situation. Note: Limit to linear inequalities.	Compound inequality Equivalent inequalities Intersection Interval notation Solution of an inequality Boundary line Test point	CC.2.2.HS.D.7 CC.2.2.HS.D.1 0 CC.2.1.HS.F.5 A1.1.3.1.1 A1.1.3.1.2 A1.1.3.1.3	Quarter 1 3 weeks
Functions	Understand the connections between proportional relationships, lines, and linear equations.	Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. Determine whether a relation is a	Arithmetic sequence Continuous graph Dependent variable Domain Explicit formula	CC.2.2.8.B.2 CC.2.4.HS.B.2 CC.2.1.HS.F.3 CC.2.2.HS.C.3 CC.2.1.HS.F.4 CC.2.2.HS.C.2	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Summarize, represent, and interpret data on two categorical and quantitative variables. Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Write functions or sequences that model relationships between two quantities. Use units as a way to understand problems and to guide the solution of multi-step problems. Graph and analyze functions and use their properties to make connections between different representations. Interpret the effects transformations have on functions. Interpret functions in terms of situations they model.	function, given a set of points or a graph. Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Create, interpret, and/or use the equation, graph, or table of a linear function. Translate from one representation of a linear function to another (i.e., graph, table, and equation).	Function Function notation Input Independent variable Linear function Nonlinear function Output Range Relation Vertical line test Maximum and minimum value Quadrants Relation	CC.2.2.HS.C.4 CC.2.2.HS.C.6 A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3 A1.2.1.2.1 A1.2.1.2.2	

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Coordinate Geometry	Define, evaluate, and compare functions. Use concepts of functions to model relationships between quantities. Use the concept and notation of functions to interpret and apply them in terms of their context. Write functions or sequences that model relationships between two quantities. Construct and compare linear, quadratic, and/or exponential models to solve problems. Summarize, represent, and interpret data on two categorical and quantitative variables. Analyze linear models to make interpretations based on the data. Interpret functions in terms of the situation they model.	Identify, describe, and/or use constant rates of change. Apply the concept of linear rate of change (slope) to solve problems. Write or identify a linear equation when given • the graph of the line, • two points on the line, or • the slope and a point on the line. Note: Linear equation may be in point-slope, standard, and/or slope-intercept form. Determine the slope and/or y-intercept represented by a linear equation or graph. Draw, identify, find and/or write an equation for a line of best fit for a scatter plot.	Direct variation Absolute value function Linear equation Line of best fit Negative correlation No correlation Opposite reciprocal Rate of change Scatter plot Parallel lines Perpendicular lines Point-slope form Positive correlation Slope Slope-intercept form Standard form Trend line X-intercept Y-intercept	CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 C.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.4.HS.B.2 CC.2.4.HS.B.3 CC.2.2.HS.C.6 A1.2.2.1.1 A1.2.2.1.2 A1.2.2.1.3 A1.2.2.1.4 A1.2.2.2.1	Quarter 2 5 weeks
Data Analysis	Analyze linear models to	Make predictions using the equations	Line of best fit Negative correlation	CC.2.4.HS.B.3	Quarter 2 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	make interpretations based on the data.	or graphs of best-fit lines of scatter plots.	No correlation Scatter plot Positive correlation	A1.2.3.2.3	
Linear Equations	Analyze and solve linear equations and pairs of simultaneous linear equations. Use reasoning to solve equations and justify the solution. Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write and/or solve a system of linear equations using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations. Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations.	Consistent Dependent Elimination method Inconsistent Independent Solution to a system of linear equations Substitution method System of linear equations	CC.2.2.8.B.3 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.2.2.1 A1.1.2.2.2	Quarter 3 2 weeks
Linear Inequalities	Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of	Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities. Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear inequalities.	Linear inequality Solution to a linear inequality Solution to a system of linear inequalities System of linear inequalities	CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.3.2.1 A1.1.3.2.2	Quarter 3 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	accuracy appropriate to limitations on measurement when reporting quantities.				
Operations with Real Numbers and Expressions	Develop and/or apply number theory concepts to find common factors and multiples. Apply and extend the properties of exponents to solve problems with rational exponents. Apply properties of rational and irrational numbers to solve real world or mathematical problems. Apply concepts of radicals and integer exponents to generate equivalent expressions. Interpret the structure of expressions to represent a quantity in terms of its context. Write expressions in equivalent forms to solve problems. Extend the knowledge of	Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials. Simplify/evaluate expressions involving properties/laws of exponents, roots, and/ or absolute values to solve problems. Note: Exponents should be integers from -10 to 10. Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial. Factor algebraic expressions, including differences of squares and trinomials. Note: Trinomials are limited to the form ax^2+bx+c where a is equal to 1 after factoring out all monomial factors.	Exponential function Negative exponent Positive exponents Monomial, binomial, trinomial, polynomial Degree of a polynomial Difference of two squares Factor by grouping Perfect-square trinomial Standard form of a polynomial Factor Composite number Prime number	CC.2.1.6.E.3 CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.2.8.B.1 CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 A1.1.1.2.1 A1.1.1.3.1 A1.1.1.5.1 A1.1.1.5.2	Quarter 3 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	arithmetic operations and apply to polynomials. Use polynomial identities to solve problems.				
Operations with Real Numbers and Expressions	Extend the knowledge of rational functions to rewrite in equivalent forms. Apply and extend properties of exponents to solve problems with rational exponents. Apply properties of rational and irrational numbers to solve real world or mathematical problems.	Simplify/reduce a rational algebraic expression Simplify square roots.	Rational equation Rational expression Rational function Hypotenuse Leg Like radicals Pythagorean Theorem Radical equation Radical expression Square root function Unlike radicals	CC.2.2.HS.D.6 CC.2.1.HS.F.1 CC.2.1.HS.F.2 A1.1.1.5.3 A1.1.1.1.2	Quarter 4 2 weeks
Data Analysis	Summarize, represent, and interpret data on a single count or measurement variable. Analyze linear models to make interpretations based on the data. Recognize and evaluate random processes underlying	Calculate and/or interpret the range, quartiles, and interquartile range of data. Estimate or calculate predictions based on a circle, line, bar graph, measures of central tendency, or other representations. Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter	Compound event Dependent events Frequency Histogram Independent events Interquartile range Measure of central tendency Outcome Outlier Percentile Permutation Probability Quartile	CC.2.4.HS.B.1 CC.2.4.HS.B.3 CC.2.4.HS.B.4 CC.2.4.HS.B.5 CC.2.4.HS.B.7 A1.2.3.1.1 A1.2.3.2.1 A1.2.3.2.2 A1.2.3.2.3 A1.2.3.3.1	Quarter 4 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	statistical experiments. Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. Apply the rules of probability to compute probabilities of compound events in a uniform probability model.	plots, measures of central tendency, or other representations). Make predictions using the equations or graphs of best-fit lines of scatter plots. Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent.	Range Sample Bar graph Circle graph Measure of dispersion Odds		

Algebra IB

Statement of Organization:

This course is designed to provide a transition (or an extra prerequisite) for students who had difficulty with Algebra I or Plane Geometry to Algebra II. Students who are successful with this course will have a firm foundation to pursue Algebra II as a follow-up course. All students should have successfully completed Plane Geometry and/or Algebra I before scheduling this course. Algebra IB meets for a minimum of one hundred twenty hours.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- o drill and practice
- o demonstration
- o teacher observation
- o portfolios
- o projects
- o standardized tests
- o teacher-made tests
- o oral presentations
- o classroom discussions
- o Benchmark assessments

Estimated Instructional Time:

Each section (1-4) below outlines a nine-week period of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Operations with Real Numbers and Expressions	Distinguish between rational and irrational numbers using their properties. Estimate irrational numbers by comparing them to rational numbers. Apply and extend the properties of exponents to solve problems with rational exponents. Apply properties of rational and irrational numbers to solve real world or mathematical problems. Apply concepts of radicals and integer exponents to generate equivalent expressions.	Compare and/or order any real numbers (Rational and irrational may be mixed) Simplify square roots Simplify/evaluate expressions involving properties/laws of exponents, roots, and/ or absolute values to solve problems. Note: Exponents should be integers from -10 to 10. Use estimation to solve problems.	Quantity Variable Algebraic expression Numerical expression Simplify Evaluate Power Base Exponent Real number Square root Rational Irrational Natural Whole Integer Absolute Value Additive Inverse Algorithm Equivalent Repeating decimal Terminating decimal Identity	CC.2.1.8.E.1 CC.2.1.8.E.4 CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.2.8.B.1 A.1.1.1.1.1 A.1.1.1.2 A1.1.1.3.1 A1.1.1.4.1	Quarter 1 1 week
Linear Equations	Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method.	Write, solve, and/or apply a linear equation (including problem situations). Use and/or identify an algebraic property to justify any step in an equation solving process. Note: Linear equations only.	Equation Inverse operations Proportion Cross products Equivalent fractions Literal Equations Absolute Value Equation	CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.2.7.B.3 A1.1.2.1.1 A1.1.2.1.2 A1.1.2.1.3 A2.1.3.2.2	Quarter 1 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.	Interpret solutions to problems in the context of the problem situation. Use algebraic processes to solve a formula for a given variable.			
Linear Inequalities	Create and graph equations or inequalities to describe numbers or relationships. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). Identify or graph the solution set to a linear inequality on a number line. Interpret solutions to problems in the context of the problem situation. Note: Limit to linear inequalities.	Compound inequality Equivalent inequalities Absolute Value Inequality Interval notation Solution	CC.2.2.HS.D.7 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.1.HS.F.5 CC.2.2.7.B.3 A1.1.3.1.1 A1.1.3.1.2 A1.1.3.1.3	Quarter 1 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.				
Functions	Graph and analyze functions and use their properties to make connections between the different representations. Summarize, represent, and interpret data on two categorical and quantitative variables. Interpret functions in terms of the situations they model.	Determine whether a relation is a function, given a set of points or a graph. Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). Create, interpret, and/or use the equation, graph, or table of a linear function. Translate from one representation of a linear function to another (i.e., graph, table, and equation).	Continuous graph Dependent variable Domain Function Function notation Input Independent variable Linear function Nonlinear function Output Range Relation Vertical line test Quadrants	CC.2.2.HS.C.2 CC.2.4.HS.B.2 CC.2.2.HS.C.6 A1.2.1.1.2 A1.2.1.1.3 A1.2.1.2.1 A1.2.1.2.2	Quarter 1 1 week
Linear Functions	Use concepts of functions to model relationships between quantities. Use the concept and notation of functions to interpret and apply them in terms of their context. Write functions or sequences that model relationships between two	Identify, describe, and/or use constant rates of change. Apply the concept of linear rate of change (slope) to solve problems. Write or identify a linear equation when given • the graph of the line, • two points on the line, or • the slope and a point on the line. Note: Linear equation may be in point slope, standard, and/or slope-intercept form.	Linear equation Rate of change Point-slope form Slope Slope-intercept form Standard form X-intercept Y-intercept	CC.2.2.8.C.2 CC.2.2.HS.C.1 CC.2.2.HS.C.3 CC.2.2.HS.C.5 A1.2.2.1.1 A1.2.2.1.2 A1.2.2.1.3 A1.2.2.1.4	Quarter 1 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	quantities. Construct and compare linear, quadratic, and/or exponential models to solve problems.	Determine the slope and/or y-intercept represented by a linear equation or graph.			
Systems of Equations	Analyze and solve linear equations and pairs of simultaneous linear equations. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Interpret solutions to problems in the context of the problem situation.	Consistent Dependent Elimination Inconsistent Independent Solution Substitution Method System of Linear Equations	CC.2.2.8.B.3 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.2.2.1 A1.1.2.2.2	Quarter 1 3 weeks
Linear Inequalities	Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	Write and/or solve a system of linear inequalities using graphing. Interpret solutions to problems in the context of the problem situation.	Linear Inequality Boundary Line Solution Test point	CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.3.2.1 A1.1.3.2.2	Quarter 2 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.				
Systems of Linear Inequalities	Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	Write and/or solve a system of linear inequalities using graphing. Interpret solutions to problems in the context of the problem situation.	System of Linear Inequalities Solution set	CC.2.2.HS.D.10 CC.2.1.HS.F.5 A1.1.3.2.1 A1.1.3.2.2	Quarter 2 1 week
Operations with Real Numbers and Expressions	Apply and extend the properties of exponents to solve problems with rational exponents. Apply concepts of radicals and integer exponents to generate equivalent expressions. Write expressions in equivalent forms to solve problems.	Simplify/evaluate expressions involving properties/laws of exponents roots, and/or absolute values to solve problems. Note: Exponents should be integers from -10 to 10. Simplify/evaluate expressions involving multiplying with exponents, powers of powers, and powers of products. Simplify/evaluate expressions involving positive and negative exponents and/or roots (may contain all types of real numbers – exponents	Hypotenuse Leg Pythagorean Theorem Right Triangle Base Power Exponent Index Radical Radicand Radical equation Rational exponent	CC.2.1.HS.F.1 CC.2.2.8.B.1 CC.2.2.HS.D.2 A1.1.1.3.1 A2.1.2.1.3 A2.1.2.1.2 A1.1.1.1.2	Quarter 2 6 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		should not exceed power of 10). Simplify square roots			
Non-Linear Equations	Apply inverse operations to solve equations or formulas for a given variable	Solve equations involving rational and/or radical expressions Use algebraic processes to solve a formula for a given variable.	Inverse Operations Square root equation Domain	A2.1.3.1.2 A2.1.3.2.2	Quarter 2 1 week
Non-Linear Expressions	CC.2.1.6.E.3 Develop and/or apply number theory concepts to find common factors and multiples CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems. CC.2.2.HS.D.3 Extend knowledge of arithmetic operations and apply to polynomials CC.2.2.HS.D.6 Extend the knowledge of rational functions to rewrite in equivalent forms	A1.1.1.2.1 Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials A1.1.1.5.1 Add, subtract, and/or multiply polynomial expressions (express answers in simplest form) A2.1.2.2.1 Factor algebraic expressions, including difference of squares and trinomials A2.1.2.2.2 Simplify rational algebraic expressions	Polynomial Monomial Binomial Trinomial Degree Constant Linear Quadratic Cubic Quartic Quintic Standard form Greatest common factor Factor Difference of squares Factor by grouping Perfect-square trinomial		Quarter 3 6 weeks
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the	Determine how a change in one variable relates to a change in a second variable	Axis of symmetry Discriminant Maximum value Minimum value	CC.2.2.HS.C.2 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.7	Quarter 3 6 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	different representations. Write expressions in equivalent forms to solve problems. Extend the knowledge of arithmetic operations and apply to polynomials. Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically. Write functions or sequences that model relationships between two quantities.	Determine the domain, range, or inverse of a relation Identify and/or determine the characteristics of an exponential, quadratic, or polynomial function (intervals of increasing/decreasing, intercepts, zeros, and asymptotes) Factor algebraic expressions, including difference of squares and trinomials Write and/or solve quadratic equations (including factoring and using the Quadratic Formula) Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics) Determine, use, and/or interpret minimum or maximum values of a specified interval of a graph of a polynomial, exponential, or logarithmic function.	Vertex Parabola Quadratic formula Standard form Vertex form Zero of a function	CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 A2.1.3.2.1 A2.2.1.1.3 A2.2.1.1.4 A2.1.2.2.1 A2.1.3.1.1 A2.2.2.1.1 A2.2.2.1.3	

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Interpret the effects transformations have on functions. Construct and compare linear, quadratic, and/or exponential models to solve problems.				
Scatter Plots	Use the concept and notation of functions to interpret and apply them in terms of their context. Analyze linear models to make interpretations based on the data.	Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot. Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations).	Line of best fit Correlation Scatter Plot Trend line	CC.2.2.HS.C.1 CC.2.4.HS.B.3 A1.2.2.2.1 A1.2.3.2.2	Quarter 4 1 week
Data Analysis	Summarize, represent, and interpret data on a single count or measurement variable. Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. Apply the rules of probability to compute probabilities of compound	Calculate and/or interpret the range, quartiles, and interquartile range of data. Estimate or calculate to make predictions based on a circle, line, bar graph, measures of central tendency, or other representations. Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other	Bar graph Box-and-whisker plot Circle Graph Frequency Histogram Interquartile range Mean Measures of central tendency Median Mode Outlier Percentile	CC.2.4.HS.B.1 CC.2.4.HS.B.5 CC.2.4.HS.B.7 A1.2.3.1.1 A1.2.3.2.1 A1.2.3.2.2 A1.2.3.3.1 A2.2.3.2.1 A2.2.3.2.2 A2.2.3.2.3	Quarter 4 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	events in a uniform probability model.	representations). Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent. Use combinations, permutations, and the fundamental counting principle to solve problems, involving probability. Use odds to find probability and/or use probability to find odds. Use probability for independent, dependent, or compound events to predict outcomes.	Range Combination Complement of an event Compound event Dependent event Independent event Outcome Permutation Probability Sample Odds		

Algebra 2

Statement of Organization:

This course is open to students from grades nine to twelve who have successfully completed foundation work in general mathematics and Algebra I with an seventy seven percent mastery level or higher. Students may take this course following either Algebra 1 or Geometry. Algebra 2 meets for a minimum of one hundred twenty clock hours and is designed to prepare students for success in higher mathematics courses and other related courses.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- classroom discussions
- projects
- teacher-made assessments

Estimated Instructional Time:

Each section (Quarters 1-4) below outlines a nine week period of instruction, to include extended content for an Honors Algebra 2 course.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Functions	Define, evaluate, and compare functions. Use concepts of functions to model relationships between quantities. Use the concept and notation of functions to interpret and apply them in terms of their context. Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Summarize, represent, and interpret data on two categorical and quantitative variables.	Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. Determine whether a relation is a function, given a set of points or a graph. Identify the domain or range of a relation.	Relation Function Vertical Line Test Domain Range Mapping	CC.2.2.8.C.1 CC.2.2.8.C.2 CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.4.HS.B.2 A1.2.1.1.1 A1.2.1.1.2 A1.2.1.1.3	<u>Quarter 1</u> 1 week
Applications of Functions	Interpret the effects transformations have on functions and find the inverses of functions. Construct and compare linear, quadratic, and exponential models to solve problems. Interpret functions in terms of the situations they model.	Identify or describe the effect of changing parameters within a family of functions	Transformation Translation Reflection Slope Rate of Change X-intercept Y-Intercept	CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 A2.2.2.2.1	1 week
Data Analysis	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.	Draw, identify, find, interpret, and/or write an equation for a regression model (<u>lines</u> and curves of best fit) for a scatter plot.	Linear Model Linear Regression	CC.2.1.HS.F.3 CC.2.1.HS.F.5 CC.2.4.HS.B.2 CC.2.4.HS.B.3	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Summarize, represent, and interpret data on two categorical and quantitative variables. Analyze linear models to make interpretations based on the data.	Make predictions using the equations or graphs of regression models (<u>lines</u> and curves of best fit) of scatter plots.		A2.2.3.1.1 A2.2.3.1.2	
Linear Inequalities	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Create and graph equations or inequalities to describe numbers or relationships. Use reasoning to solve equations and justify the solution method. Represent, solve, and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.	Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). Identify or graph the solution set to a linear inequality on a number line. Interpret solutions to problems in the context of the problem situation.	Linear Inequality	CC.2.1.HS.F.5 CC.2.2.HS.D.7 CC.2.2.HS.D.9 CC.2.2.HS.D.10 A1.1.3.1.1 A1.1.3.1.2 A1.1.3.1.3	1 week
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions.	Determine how a change in one variable relates to a change in a second variable (e.g., $y = 4/x$; if x doubles, what happens to y?). Use algebraic processes to solve a formula for a given variable (e.g., solve $d = rt$ for r).	Inverse Operations Literal Equations	CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 A2.1.3.2.1 A2.1.3.2.2	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method.				
Patterns, Relations, and Functions	Use the concept and notation of functions to interpret and apply them in terms of their context. Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Construct and compare linear, quadratic, and exponential models to solve problems. Interpret functions in terms of the situations they model. Summarize, represent, and interpret data on two categorical and quantitative variables.	Analyze a set of data for the existence of a pattern, and represent the pattern with a rule algebraically and/or graphically. Determine the domain, range, or inverse of a relation. Identify and/or determine the characteristics of an exponential, <u>quadratic</u>, or polynomial function (e.g., intervals of increase/decrease, intercepts, zeros, and asymptotes).	Quadratic Function Parabola Vertex Vertex Form Standard Form Axis of Symmetry	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.4.HS.B.2 A2.2.1.1.1 A2.2.1.1.3 A2.2.1.1.4	1 week
Applications of Functions	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.	Create, interpret, and/or use the equation, graph, or table of a polynomial function (including <u>quadratics</u>).	Maximum Value Minimum Value	CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Use units as a way to understand problems and to guide the solution of multi-step problems. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Construct and compare linear, quadratic, and exponential models to solve problems. Interpret functions in terms of the situations they model. Create and graph equations or inequalities to describe numbers or relationships.	Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic function. Translate a polynomial, exponential, or logarithmic function from one representation of a function to another (graph, table, and equation). Identify or describe the effect of changing parameters within a family of functions.		CC.2.2.HS.C.6 CC.2.2.HS.D.7 A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1	
Non-Linear Expressions	Interpret the structure of expressions to represent a quantity in terms of its context. Write expressions in equivalent forms to solve problems. Extend the knowledge of arithmetic operations and apply to polynomials.	Factor algebraic expressions, including differences of squares and trinomials.	Greatest Common Factor Binomial Trinomial Difference of Squares Perfect Square Trinomial	CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 A2.1.2.2.1	1 week
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities.	Write and/or solve quadratic equations (including factoring and using the Quadratic Formula).	Quadratic Equation Root Solution Zero	CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.5	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Interpret the effects transformations have on functions and find the inverses of functions. Construct and compare linear, <u>quadratic</u>, and exponential models to solve problems. Interpret functions in terms of the situations they model. Use polynomial identities to solve problems. Extend the knowledge of rational functions to rewrite in equivalent forms. Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.		Complete the Square Quadratic Formula Discriminant	CC.2.2.HS.D.6 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 A2.1.3.1.1	
Operations with Complex Numbers	Extend the knowledge of arithmetic operations and apply to complex numbers.	Simplify/write square roots in terms of i .	Imaginary Number Complex	CC.2.1.HS.F.6 CC.2.1.HS.F.7	<u>Quarter 2</u> 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Apply concepts of complex numbers in polynomial identities and quadratic equations to solve problems.	Simplify/evaluate expressions involving powers of i . Add and subtract complex numbers. Multiply and divide complex numbers.	Number Complex Conjugate Absolute Value of Complex Numbers	A2.1.1.1.1 A2.1.1.1.2 A2.1.1.2.1 A2.1.1.2.2	
Data Analysis	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Summarize, represent, and interpret data on two categorical and quantitative variables.	Draw, identify, find, interpret, and/or write an equation for a regression model (lines and <u>curves</u> of best fit) for a scatter plot. Make predictions using the equations or graphs of regression models (lines and <u>curves</u> of best fit) of scatter plots.	Quadratic Model Quadratic Regression	CC.2.1.HS.F.3 CC.2.1.HS.F.5 CC.2.4.HS.B.2 CC.2.4.HS.B.3 A2.2.3.1.1 A2.2.3.1.2	1 week
Non-Linear Expressions	Apply and extend the properties of exponents to solve problems with rational exponents. Write expressions in equivalent forms to solve problems.	Simplify/evaluate expressions involving multiplying with exponents, powers of powers, and powers of products.	Exponent Base Significant digits Standard Notation Power of a Power	CC.2.1.HS.F.1 CC.2.2.HS.D.2 A2.1.2.1.3	1 week
Operations with Real Numbers and Expressions	Interpret the structure of expressions to represent a quantity in terms of its context. Write expressions in equivalent forms to solve problems.	Add, subtract, and/or multiply polynomial expressions (express answers in simplest form).	Degree of a polynomial Monomial Binomial Trinomial Cubic Quartic	CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 A1.1.1.5.1	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Extend the knowledge of arithmetic operations and apply to polynomials. Use polynomial identities to solve problems.		Quintic		
Patterns, Relations, and Functions	Use the concept and notation of functions to interpret and apply them in terms of their context. Graph and analyze functions, and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret functions in terms of the situations they model. Summarize, represent, and interpret data on two categorical and quantitative variables.	Analyze a set of data for the existence of a pattern, and represent the pattern with a rule algebraically and/or graphically. Determine the domain, range, or inverse of a relation. Identify and/or determine the characteristics of an exponential, quadratic, or <u>polynomial</u> function (e.g., intervals of increase/decrease, intercepts, zeros, and asymptotes).	Transformation Translation Reflection Intervals Intercepts Zeros Multiplicity Turning Points End Behavior	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.4.HS.B.2 A2.2.1.1.1 A2.2.1.1.3 A2.2.1.1.4	1 week
Applications of Functions	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Use units as a way to understand problems and to guide the solution of multi-step problems. Write functions or sequences that model relationships between two quantities.	Create, interpret, and/or use the equation, graph, or table of a <u>polynomial function</u> (including quadratics). Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a <u>polynomial</u>, exponential, or logarithmic function.		CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.7 A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Interpret the effects transformations have on functions, and find the inverses of functions. Interpret functions in terms of the situations they model. Create and graph equations or inequalities to describe numbers or relationships.	Translate a <u>polynomial</u>, exponential, or logarithmic function from one representation of a function to another (graph, table, and equation). Identify or describe the effect of changing parameters within a family of functions.			
Non-Linear Expressions	Interpret the structure of expressions to represent a quantity in terms of its context. Write expressions in equivalent forms to solve problems. Extend the knowledge of arithmetic operations and apply to polynomials.	Factor algebraic expressions.	Sum of cubes Difference of cubes Synthetic Division	CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 A2.1.2.2.1	1 week
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Interpret functions in terms of the situations they model. Use polynomial identities to solve problems.	Write and/or solve polynomial equations.	Fundamental Theorem of Algebra	CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.5 CC.2.2.HS.D.6 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 A2.1.3.1.1	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Extend the knowledge of rational functions to rewrite in equivalent forms. Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.				
Data Analysis	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Summarize, represent, and interpret data on two categorical and quantitative variables.	Draw, identify, find, interpret, and/or write an equation for a regression model (lines and <u>curves</u> of best fit) for a scatter plot. Make predictions using the equations or graphs of regression models (lines and <u>curves</u> of best fit) of scatter plots.	Cubic Model Cubic Regression Quartic Model Quartic Regression	CC.2.1.HS.F.3 CC.2.1.HS.F.5 CC.2.4.HS.B.2 CC.2.4.HS.B.3 A2.2.3.1.1 A2.2.3.1.2	1 week
Operations with Real Numbers and Expressions	Apply and extend the properties of exponents to solve problems with rational exponents. Apply properties of rational and irrational numbers to solve real-world or mathematical problems.	Simplify square roots	Radical Radicand Root	CC.2.1.HS.F.1 CC.2.1.HS.F.2 A1.1.1.1.2	<u>Quarter 3</u> 1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Patterns, Relations, and Functions	Use the concept and notation of functions to interpret and apply them in terms of their context. Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret functions in terms of the situations they model. Summarize, represent, and interpret data on two categorical and quantitative variables.	Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically. Determine the domain, range, or <u>inverse</u> of a relation. Identify and/or determine the characteristics of an exponential, quadratic, or polynomial function (e.g., intervals of increase/decrease, intercepts, zeros, and asymptotes).	Square Root Function Cube Root Function Radical Function Inverse Function Inverse function notation Horizontal line test One-to-one	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.4.HS.B.2 A2.2.1.1.1 A2.2.1.1.3 A2.2.1.1.4	2 weeks
Applications of Functions	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Use units as a way to understand problems and to guide the solution of multi-step problems. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Interpret functions in terms of the situations they model.	Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics). Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic function. Translate a polynomial, exponential, or logarithmic function from one representation of a function to another (graph, table, and equation).	End Point Point of Inflection	CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.7 A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1	2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Create and graph equations or inequalities to describe numbers or relationships.	Identify or describe the effect of changing parameters within a family of functions.			
Non-Linear Expressions	Apply and extend the properties of exponents to solve problems with rational exponents. Write expressions in equivalent forms to solve problems.	Use exponential expressions to represent rational numbers. Simplify/evaluate expressions involving positive and negative exponents and/or roots	Rational Exponent	CC.2.1.HS.F.1 CC.2.2.HS.D.2 A2.1.2.1.1 A2.1.2.1.2	1 week
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Interpret functions in terms of the situations they model. Use polynomial identities to solve problems. Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method.	Solve equations involving rational and/or <u>radical</u> expressions.	Radical Equation	CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.5 CC.2.2.HS.D.6 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 A2.1.3.1.2	1 week

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.				
Non-Linear Expressions	Interpret the structure of expressions to represent a quantity in terms of its context. Write expressions in equivalent forms to solve problems. Extend the knowledge of arithmetic operations and apply to polynomials. Understand the relationship between zeros and factors of polynomials to make generalizations about functions and their graphs. Use polynomial identities to solve problems.	Simplify rational algebraic expressions.	Least common denominator	CC.2.2.HS.D.1 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.4 CC.2.2.HS.D.5 A2.1.2.2.2	2 week
Patterns, Relations, and Functions	Use the concept and notation of functions to interpret and apply them in terms of their context. Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret functions in terms of the situations they model.	Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically. Determine the domain, range, or inverse of a relation. Identify and/or determine the characteristics of an exponential, quadratic, or polynomial function (e.g., intervals of	Rational Function Continuous Discontinuous Removable Discontinuity Asymptote	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.4.HS.B.2 A2.2.1.1.1 A2.2.1.1.3 A2.2.1.1.4	<u>Quarter 4</u> 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Summarize, represent, and interpret data on two categorical and quantitative variables.	increase/decrease, intercepts, zeros, and <u>asymptotes</u>).			
Applications of Functions	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Use units as a way to understand problems and to guide the solution of multi-step problems. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Interpret functions in terms of the situations they model. Create and graph equations or inequalities to describe numbers or relationships.	Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics). Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, exponential, or logarithmic function. Translate a polynomial, exponential, or logarithmic function from one representation of a function to another (graph, table, and equation). Identify or describe the effect of changing parameters within a family of functions.		CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.7 A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1	2 weeks
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions.	Solve equations involving <u>rational</u> and/or radical expressions.	Inverse Variation Direct Variation Rational equation	CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.5 CC.2.2.HS.D.6 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9	2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Interpret functions in terms of the situations they model. Use polynomial identities to solve problems. Extend the knowledge of rational functions to rewrite in equivalent forms. Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.			CC.2.2.HS.D.10 A2.1.3.1.2	
Data Analysis	Recognize and evaluate random processes underlying statistical experiments. Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. Use the concepts of independence and conditional probability to interpret data.	Use combinations, permutations, and the fundamental counting principle to solve problems involving probability. Use odds to find probability and/or use probability to find odds. Use probability for independent, dependent, or compound events to predict outcomes.	Permutation Combination Fundamental Counting Principle Factorial Odds Probability Independent Events Dependent Events	CC.2.4.HS.B.4 CC.2.4.HS.B.5 CC.2.4.HS.B.6 CC.2.4.HS.B.7 A2.2.3.2.1 A2.2.3.2.2 A2.2.3.2.3	2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Apply the rules of probability to compute probabilities of compound events in a uniform probability model.		Compound Events Mutually Exclusive Events Sample Space Conditional Probability		
Non-Linear Expressions	Apply and extend the properties of exponents to solve problems with rational exponents. Write expressions in equivalent forms to solve problems.	Simplify or evaluate expressions involving logarithms and exponents.	Common logarithm Natural logarithm Properties of Logarithms Change of base formula	CC.2.1.HS.F.1 CC.2.2.HS.D.2 A2.1.2.1.4	Honors Algebra 2 Content
Non-Linear Equations	Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Construct and compare linear, quadratic, and exponential models to solve problems. Interpret functions in terms of the situations they model. Use polynomial identities to solve problems.	Write and/or solve a simple exponential or logarithmic equation (including common and natural logarithms). Write, solve, and/or apply linear or exponential growth or decay (including problem situations).	Exponential Equation Logarithmic equation	CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.5 CC.2.2.HS.D.6 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 A2.1.3.1.3 A2.1.3.1.4	Honors Algebra 2 Content

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Create and graph equations or inequalities to describe numbers or relationships. Apply inverse operations to solve equations or formulas for a given variable. Use reasoning to solve equations and justify the solution method. Represent, solve and interpret equations/inequalities and systems of equations/inequalities algebraically and graphically.				
Patterns, Relations, and Functions	Use the concept and notation of functions to interpret and apply them in terms of their context. Graph and analyze functions and use their properties to make connections between the different representations. Write functions or sequences that model relationships between two quantities. Construct and compare linear, quadratic, and <u>exponential</u> models to solve problems. Interpret functions in terms of the situations they model. Summarize, represent, and interpret data on two categorical and quantitative variables.	Analyze a set of data for the existence of a pattern and represent the pattern with a rule algebraically and/or graphically. Determine the domain, range, or inverse of a relation. Identify and/or determine the characteristics of an <u>exponential</u>, quadratic, or polynomial function (e.g., intervals of increase/decrease, intercepts, zeros, and asymptotes).	Exponential function Exponential growth Exponential decay Logarithmic Function	CC.2.2.HS.C.1 CC.2.2.HS.C.2 CC.2.2.HS.C.3 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.4.HS.B.2 A2.2.1.1.1 A2.2.1.1.3 A2.2.1.1.4	Honors Algebra 2 Content

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Applications of Functions	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Use units as a way to understand problems and to guide the solution of multi-step problems. Write functions or sequences that model relationships between two quantities. Interpret the effects transformations have on functions and find the inverses of functions. Construct and compare linear, quadratic, and <u>exponential models</u> to solve problems. Interpret functions in terms of the situations they model. Create and graph equations or inequalities to describe numbers or relationships.	Create, interpret, and/or use the equation, graph, or table of a polynomial function (including quadratics). Determine, use, and/or interpret minimum and maximum values over a specified interval of a graph of a polynomial, <u>exponential</u>, or <u>logarithmic function</u>. Translate a polynomial, <u>exponential</u>, or <u>logarithmic function</u> from one representation of a function to another (graph, table, and equation). Identify or describe the effect of changing parameters within a family of functions.		CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.2.HS.C.3 CC.2.2.HS.C.4 CC.2.2.HS.C.5 CC.2.2.HS.C.6 CC.2.2.HS.D.7 A2.2.2.1.1 A2.2.2.1.3 A2.2.2.1.4 A2.2.2.2.1	Honors Algebra 2 Content
Data Analysis	Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. Summarize, represent, and interpret data on two categorical and quantitative variables.	Draw, identify, find, interpret, and/or write an equation for a regression model (lines and <u>curves</u> of best fit) for a scatter plot. Make predictions using the equations or graphs of regression models (lines and <u>curves</u> of best fit) of scatter plots.	Exponential Model Exponential Regression Logarithmic Model Logarithmic Regression	CC.2.1.HS.F.3 CC.2.1.HS.F.5 CC.2.4.HS.B.2 CC.2.4.HS.B.3 A2.2.3.1.1 A2.2.3.1.2	Honors Algebra 2 Content

Geometry

Statement of Organization:

This course is a one credit course open to eligible students in grades nine to twelve. Students are to have successfully completed Algebra I before taking this course. Plane Geometry classes meet for a minimum of one hundred twenty hours.

Expected Levels of Achievement:

All students will be expected to have a seventy percent (70%) retention of materials taught and tested.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- projects
- standardized tests
- teacher-made tests
- written presentations
- oral presentations
- classroom discussions

Estimated Instructional Time:

High school courses meet every other day for eighty minutes. Each of the four quarters is nine weeks of instruction.

Sequence

The Big Ideas are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Coordinate Geometry and Right Triangles	Apply coordinate geometry to prove simple geometric theorems algebraically.	Calculate the distance and/or midpoint between two points on a number line or on a coordinate plane. Relate slope to perpendicularity and/or parallelism (limit to linear algebraic equations). Use slope, distance, and/or midpoint between two points on a coordinate plane to establish properties of a two-dimensional shape	Line Midpoint Parallel Perpendicular Point Ray Segment Slope	CC.2.3.HS.A.11 G2.1.2.1 G2.1.2.2 G2.1.2.3	Quarter 1 3 weeks
Measurements of Two-Dimensional Shapes and Figures	Understand and apply congruence, similarity, and geometric transformations using various tools. Verify and apply geometric theorems as they relate to geometric figures.	Use properties of angles formed by intersecting lines to find the measures of missing angles. Estimate area, perimeter, or circumference of an irregular figure. Find the measurement of a missing length, given the perimeter, circumference, or area. Develop and/or use strategies to estimate the area of a compound/composite figure.	Acute Angle Adjacent Angles Angle Angle Bisector Area Circle Circumference Complementary Angles Compound Figure Diameter Obtuse Angle Perimeter Radius Supplementary Angles Vertical Angles	CC.2.3.8.A.2 CC.2.3.HS.A.3 G.2.2.1.1 G2.2.2.1 G2.2.2.2 G2.2.2.4	Quarter 1 3 weeks
Congruence, Similarity, and Proofs	Verify and apply geometric theorems as they relate to geometric figures.	Write, analyze, complete, or identify formal proofs (e.g., direct and/or indirect proofs/proofs by contradiction).	Congruence Correspondence Direct Proof Proof	CC.2.3.HS.A.3 G.1.3.2.1 G.1.3.1.1	Quarter 1 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		Identify and/or use properties of congruent and similar polygons or solids.			
Measurements of Two-Dimensional Shapes and Figures	Understand and apply congruence, similarity, and geometric transformations using various tools. Verify and apply geometric theorems as they relate to geometric figures.	Use properties of angles formed by intersecting lines to find the measures of missing angles. Use properties of angles formed when two parallel lines are cut by a transversal to find the measures of missing angles.	Alternate Interior Angles Corresponding Angles	CC.2.3.8.A.2 CC.2.3.HS.A.3 G.2.2.1.1 G.2.2.1.2	Quarter 2 3 weeks
Properties of Polygons and Polyhedral	Understand and apply congruence, similarity, and geometric transformations using various tools. Verify and apply geometric theorems as they relate to geometric figures.	Identify and/or use properties of triangles. Identify and/or use properties of isosceles and equilateral triangles.	Altitude Equilateral Triangle Isosceles Triangle Median Right Triangle Scalene Triangle	CC.2.3.8.A.2 CC.2.3.HS.A.3 G.1.2.1.1 G.1.2.1.3	Quarter 2 6 weeks
Properties of Polygons and Poly Polyhedral	Understand and apply congruence, similarity, and geometric transformations using various tools. Verify and apply geometric theorems as they relate to geometric figures.	Identify and/or use properties of regular polygons. Identify and/or use properties of quadrilaterals.	Parallelogram Rectangle Regular Polygon Rhombus Square Trapezoid	CC.2.3.8.A.2 CC.2.3.HS.A.3 G.1.2.1.4 G.1.2.1.2	Quarter 3 3 weeks
Congruence, Similarity, and Proofs	Create justifications based on transformations to establish similarity of plane figures. Verify and apply theorems involving similarity as they relate to plane figures.	Identify and/or use properties of congruent and similar polygons or solids. Identify and/or use proportional relationships in similar figures.	Pythagorean Theorem Right Triangle Trigonometric Ratios	CC.2.3.HS.A.5 CC.2.3.HS.A.6 G.1.3.1.1 G.1.3.1.2	Quarter 3 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Measurements of Two-Dimensional Shapes and Figures	Use the concept and notation of functions to interpret and apply them in terms of their context. Verify and apply geometric theorems as they relate to geometric figures. Extend the concept of similarity to determine arc lengths and areas of sectors of circles.	Estimate area, perimeter, or circumference of an irregular figure. Find the measurement of a missing length, given the perimeter, circumference, or area. Find the side lengths of a polygon with a given perimeter to maximize the area of the polygon. Develop and/or use strategies to estimate the area of a compound/composite figure. Find the area of a sector of a circle.	Sector Semicircle Two-Dimensional	CC.2.2.HS.C.1 CC.2.3.HS.A.3 CC.2.3.HS.A.9 G.2.2.2.1 G.2.2.2.2 G.2.2.2.3 G.2.2.2.4	Quarter 3 2-3 weeks
Measurements of Three-Dimensional Shapes and Figures	Apply the concepts of volume of cylinders, cones, and spheres to solve real-world and mathematical problems. Explain volume formulas and use them to solve problems. Apply geometric concepts to model and solve real world problems.	Calculate the surface area of prisms, cylinders, cones, pyramids, and/or spheres. Calculate the volume of prisms, cylinders, cones, pyramids, and/or spheres. Find the measurement of a missing length given the surface area or volume.	Cylinder Pyramid Sphere Surface Area Three Dimensional Volume	CC.2.3.8.A.1 CC.2.3.HS.A.12 CC.2.3.HS.A.14 G.2.3.1.1 G.2.3.1.2 G.2.3.1.3	Quarter 4 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Properties of Circles, Spheres, and Cylinders	Apply geometric theorems to verify properties of circles. Extend the concept of similarity to determine arc lengths and areas of sectors of circles. Analyze relationships between two-dimensional and three-dimensional objects.	Identify, determine, and/or use the radius, diameter, segment, and/or tangent of a circle. Identify, determine, and/or use the arcs, semicircles, sectors, and/or angles of a circle. Use chords, tangents, and secants to find missing arc measures or missing segment measures. Identify and/or use the properties of a sphere or cylinder.	Arc Arc Length Chord Diameter Radius Secant Semicircle Tangent	CC.2.3.HS.A.8 CC.2.3.HS.A.9 CC.2.3.HS.A.13 G1.1.1.1 G1.1.1.2 G1.1.1.3 G1.1.1.4	Quarter 4 4 weeks

Business Math

Statement of Organization:

This one credit course is designed to develop skill in the four basic mathematics operations in a business and consumer related environment. Problems address such issues as checkbook records, purchasing, wages and deductions, borrowing and saving money and homeownership. Business mathematics meets for a minimum of one hundred twenty hours and is offered to students from grades eleven and twelve.

Expected Levels of Achievement:

All students will be expected to achieve mastery of all skills and concepts taught by obtaining a minimum of eight percent (77%) retention of materials taught and tested.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- demonstration
- teacher observation
- portfolios
- projects
- standardized tests
- teacher-made tests
- Benchmark Tests
- written presentations
- oral presentations
- classroom discussions

Estimated Instructional Time:

Each section (1-4) below outlines a nine-week period of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Money Records	Cash Records Check Register Record Reconciling the Check Register Balance	Understanding cash receipts records Understanding cash payment records Understanding cash records with special columns Understanding checkbook records Proving the checkbook balance Solving special reconciliation problems	ATM Balance Bank statement Check Check Register Deposit Deposit Slip Gross Net Outstanding Checks Reconciliation Statement Service Charge	15.1.12.P..	Quarter 1 3 weeks
Gross and Average Pay	Estimating Multiplication and Division Finding Gross Pay Finding Average Pay	Finding gross pay for salary, hourly, and piece-rate pay Finding average pay	Average Pay Employees Employer Gross Pay Hourly Rate Piece Rate Salary	15.1.12.M.	Quarter 1 3 weeks
Regular and Overtime Pay	Operations with Fractions and Mixed Numbers Ratios and Proportions Regular and Overtime Pay Timecards Fractional Relationships	Understanding regular time, and overtime Figuring overtime pay Calculating time worked and gross pay from timecards Understanding ratio and proportion Solving problems in fractional relationships	Double-Time Pay Gross Pay Overtime Regular Pay Regular Time Time-and-Half Pay Timecard	15.1.12.M.	Quarter 1 3 weeks
Net Pay, Fringe Benefits, and Commission	Decimal, Fractions, and Percents Deductions and Take-Home Pay Fringe Benefits and Job Expenses	Understanding deductions and take-home pay Understanding fringe benefits and job expenses Using percents	Deductions FICA Tax Fringe Benefits Graduated Commission Job Benefits	15.1.12.M.	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Percent Relationships Commission	Solving problems in percent relationships Figuring commissions Figuring the agent's commission	Job Expenses Net Proceeds Quota Straight Commission Withholding Allowance Withholding Tax		
Measurements	Metric Measurements Customary Measurements	Converting Metric Lengths, Capacities, and Masses (meter, liter, gram) Converting Customary Lengths, Capacities, and Weights	Kilo- Hecto- Deca- Deci- Centi- Milli-		Quarter 2 3 weeks
Buying for You and Your Home	Planning a Budget Checking Sales Receipts Finding Unit Prices Buying Wisely Checking and Reducing Energy Costs	Planning spending Using sales slips Figuring extensions Figuring unit price	Budget Fixed Expense Fuel Adjustment Rate Kilowatt-Hour Payback Period Subtotal Therms Unit Price		Quarter 2 3 weeks
Saving and Borrowing Money	Simple Interest Compound Interest Statement Savings Special Savings Accounts Installment Buying Credit Cards	Understanding statement savings accounts Understanding simple and compound interest Understanding exact and banker's interest Using interest tables Understanding installment loans Understanding installment buying Understanding credit cards	APR Banker's Interest Certificate of Deposit Collateral Compound Interest Effective Rate of Interest Finance Charge Installment Loans Interest		Quarter 3 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Money Market Accounts Principal		
Paying Your Taxes	Property Taxes Social Security Taxes and Benefits Federal Income Tax State and Local Income Taxes	Understanding property taxes Figuring income taxes Understanding taxpayers' rights and responsibilities Working from W-4 to 1040	Adjusted Gross Income Assessed Value Dependent Earned Income Exemption Federal Income Tax Income Tax Return Standard Deduction	15.1.12.Y. 15.6.12.E.	Quarter 3 3 weeks
Buying, Renting, and Running Your Home	Buying a Home The Cost of Owning a Home Renting a Home	Buying a home Owning a home Understanding property insurance Collecting property insurance	Amortization Table Closing Costs Depreciation Down Payment Equity Fixed Rate Mortgage Lease Mortgage Variable Rate Mortgage	15.6.12.B. 15.6.12.H.	Quarter 3 3 weeks
Buying, Leasing, and Running a Motor Vehicle	Buying a Vehicle The Cost of Operating a Vehicle Leasing a Vehicle	Figuring depreciation of a vehicle Operating a vehicle Insuring a vehicle Figuring travel expenses	Average Annual Depreciation Down Payment Trade-In Value	15.6.12.B. 15.6.12.H.	Quarter 4 4 weeks
Investments	Investments in Bonds Investments in Stocks Investments in Mutual Funds	Savings Bonds Municipal and Corporate Bonds Stocks Mutual Funds	Bond Broker Commission Common Stock Discount Dividends		Quarter 4 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
			Market Value Mutual Funds Net Proceeds Par Value Preferred Stock Premium Rate of Income Savings Bonds Shareholders Stock		

Statistics

Statement of Organization:

This elective mathematics course is a thorough introduction to the basic concepts of descriptive and inferential statistics. It is open to all students who have successfully completed Algebra 2. Statistics class meets for a minimum of one hundred twenty clock hours for one credit.

Expected Levels of Achievement:

All students will be expected to achieve mastery of all skills and concepts taught by obtaining a minimum of seventy-seven percent (77%) retention of materials taught and tested.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Student competence will be assessed through the use of one or more of the following methods:
- drill and practice
- demonstration
- teacher observation
- portfolios
- projects
- standardized tests
- teacher-made tests
- Benchmark Tests
- written presentations
- oral presentations
- classroom discussions

Estimated Instructional Time:

Each section (1-4) below outlines a nine-week period of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Introduction	Recognizing statistics in everyday life Understanding statistical terms Understanding approximate numbers	Classification of variables and levels of measurement Discrete versus continuous variables	Population Sample Descriptive Statistics Inferential Statistics Categorical Data Numerical Data Discrete Data Continuous Data	CC.2.4.HS.B.4	Quarter 1 3 weeks
Common statistical measures	Using measures of central tending Understanding symbols and formulas Using measures of variability Applying measures of an individual in a population Calculating rates	Mean, median, and mode: Computations Rejecting unreasonable claims based on average statistics Weighted mean: Tabular data Estimating the mean of grouped data Percentiles Population standard deviation Sample standard deviation Estimating the standard deviation of grouped data Chebyshev's theorem and the empirical rule Mean, median, and mode: Comparisons Transforming the mean and standard deviation of a data set Making reasonable inferences based on proportion statistics	Sample Mean Population Mean Sample Median Deviations from the Mean Sample Variance Standard Deviation Quartiles Interquartile Range Z score Percentile	CC.2.4.HS.B.1 CC.2.4.HS.B.2	Quarter 1 3 weeks
Frequency tables and graphs	Organizing data Understanding percentile rank, z-scores and graphs	Interpreting pie charts Computations from pie charts Double bar charts Histograms for grouped data Frequency polygons for grouped data Interpreting relative frequency histograms	Frequency Distribution Comparative Bar Chart Pie Chart Segmented Bar Graph	CC.2.4.HS.B.1 CC.2.4.HS.B.2	Quarter 1 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		Cumulative distributions and ogives Comparing means without calculation Comparing standard deviations without calculation Box-and-whisker plots Interpreting a stem-and-leaf display Using back-to-back stem-and-leaf displays to compare data sets	Stem-and-Leaf Display Histogram Scatterplot		
Probability	Calculating probability Understanding the relationship between probability, proportion and the percentage of area in a histogram	Factorial expressions Combinations Permutations Permutations, combinations, and the multiplication principle for counting Probability of draws with replacement Probabilities of draws without replacement Venn diagrams: Two events Venn diagrams: Three events Venn diagrams: Word problems Outcomes and event probability Die rolling Probability of intersection or union: Word problems Independent events: Basic Probability of union: Basic Mutually exclusive events: Two events Mutually exclusive events: Three events Probability of independent events Independent events: Two events Calculating relative frequencies in a contingency table Conditional probability: Basic Probability of dependent events Intersection and conditional probability	Sample Space Event Mutually Exclusive Events Independent Events	CC.2.4.HS.B.6 CC.2.4.HS.B.7 .	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
		Conditional probability: Mutually exclusive events Conditional probability: Independent events Tree diagrams for conditional probabilities Law of total probabilities Bayes' theorem			
Binomial distribution	Calculating variables Recognizing binomial random variables Reading probability tables	Binomial problems: Mean and standard deviation Binomial problems: Basic Binomial problems: Advanced	Binomial Distribution	CC.2.4.HS.B.7	Quarter 2 2 weeks
Normal distribution	Reading and understanding binomial histograms Understanding the Theoretical Normal Curve	Standard normal probabilities Standard normal values: Basic Standard normal values: Advanced Normal versus standard normal density curves Normal distribution raw scores Mean and deviation of a normal distribution Normal distribution: Word problems	Normal Distribution	CC.2.4.HS.B.7	Quarter 2 2 weeks
Approximations	Using the normal distribution to approximate the binomial distribution Understanding the conditions for approximating distribution	Normal approximation to binomial Central limit theorem: Sample mean Central limit theorem: Sample sum Central limit theorem: Sample proportion		CC.2.4.HS.B.7	Quarter 2 2 weeks
One-sample hypothesis testing of percentages in binomial experiments	Understanding statistical hypothesis	Determining null and alternative hypotheses Type I and Type II errors Type I and Type II errors and power	Hypothesis Null Hypothesis Alternative Hypothesis	CC.2.4.HS.B.5	Quarter 3 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Understanding statistical error Recognizing Type I errors and decision rules Recognizing Type II errors (optional) Using hypothesis testing procedures	Effect size, sample size, and power Hypothesis test for a population proportion	Type I error Type II error Test Statistic P-value Power		
Two-sample hypothesis testing of percentages in binomial experiments	Recognizing symbols for estimates Calculating distribution of differences Using the two-sample testing procedures	Hypothesis test for the difference of population proportions		CC.2.4.HS.B.5	Quarter 3 3 weeks
Hypothesis testing with large sample means	Understanding sample means Calculating two-sample tests of means for large samples	Hypothesis test for the population mean: Z test Hypothesis test for the difference of population means: Z test Hypothesis test for the difference of population means: Paired comparisons	Independent samples Paired Samples	CC.2.4.HS.B.5	Quarter 3 3 weeks
Hypothesis testing with small sample means	Understanding t-distribution Using two-sample t-tests Applying t-tests for paired differences, matched-pair designs	Hypothesis test for the population mean: t test Hypothesis test for the difference of population means: t test	t-score	CC.2.4.HS.B.5	Quarter 4 3 weeks
Confidence intervals	Understanding the term	Selecting a distribution for inferences on the population mean	Point Estimate Confidence Interval	CC.2.4.HS.B.5	Quarter 4 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Using confidence intervals calculate proportions in binomial experiments Using them to calculate means based of large and small samples Determining two-sample differences	Confidence interval for the population mean: Use of the standard normal Choosing an appropriate sample size Confidence interval for the population mean: Use of the t distribution Confidence interval for a population proportion Confidence interval for the difference of population means: Use of the standard normal Confidence interval for the difference of population means: Use of the t distribution Confidence interval for the difference of population proportions	Confidence Level		
Chi square	Testing for independence Calculating degrees of freedom in a contingency table Using a shorter way to compute x-squared Reading two by two contingency tables Applying the goodness-of-fit test	Contingency tables: Expected frequencies Chi-square goodness-of-fit test Chi-square test of independence	One-way Frequency Table Goodness-of-Fit Test Test for Homogeneity Test for Independence	CC.2.4.HS.B.5	Quarter 4 3 weeks

Precalculus

Statement of Organization:

This course is open to students from grades ten to twelve who have successfully completed foundation work in general mathematics including Algebra I, Algebra II, and Geometry. Precalculus meets for a minimum of one hundred twenty clock hours and is designed to prepare students for success in Calculus and higher mathematics courses. Additionally, Precalculus is a course designed to prepare students for a career path in a STEM related field.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy – seven percent (77%) on all graded forms of assessment

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- teacher observation
- projects
- teacher-made tests
- classroom discussions

Estimated Instructional Time:

Each section (1-4) below outlines a nine-week period of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery. The big ideas are determined by the University of Pittsburgh at Bradford since this is a dual enrollment course.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
Analyzing Functions	Parent Functions Transformations Domain and Range	Describe transformations of parent functions using the form $y = a \cdot f(x \pm h) \pm k$ to include linear, absolute value, quadratic, cubic, square root, and cube root Determine the domain of functions given equations and graphs Determine the range of functions given equations and graphs Produce an equation given a graph	Parent Functions Transformations Domain Range	Quarter 1 1 week
Polynomial Functions	Polynomial expressions, equations, and functions	Classify polynomials determined by degree and number of terms Write/convert polynomial expressions in standard and factored form Factor polynomials using various methods to include quadratic, special cases, and grouping Find zeros and/or solutions to polynomial functions and/or equations using factoring, graphing, and/or rational root theorem Find zeros and their multiplicities Determine end behavior, maximum number of turning points, and roots of the graph of polynomials Find y-intercept of polynomial expressions Sketch polynomial functions using zeros and their multiplicities, intercepts, end behavior, and degree	Polynomial Standard Form Factored Form Zeros Solutions Multiplicities End behavior	Quarter 1 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
Rational Functions	Rational expressions, equations, and functions	Determine the domain of rational functions Find the intercepts of rational functions Simplify rational expressions Locate holes of rational functions using graphs and/or equations Find vertical, horizontal, and/or oblique (or slant) asymptotes using a graph and/or equation Sketch rational functions by analyzing the function	X-Intercept Y-Intercept Vertical asymptote Horizontal asymptote Oblique asymptote Holes	Quarter 1 2 weeks
Functions and their Graphs	Function Operations Intercepts Symmetry Composite Functions Inverse Functions	Find the x- and y- intercepts of graphs Test for x-axis, y-axis, and/or origin symmetry given a graph and/or equation Find and evaluate composite functions Determine the domain of composite functions Determine if a function has an inverse using a table of values (one-to-one) or horizontal line test Find inverse functions and apply characteristics to identify the domain and range Verify inverse functions using composition	Function Operations Intercepts Symmetry Even Function Odd Function Composite Functions Inverse Functions Horizontal Line Test	Quarter 1 4 weeks
Exponential Functions	Exponential expressions, equations, and functions	Graph exponential growth and decay models Analyze exponential functions using transformations of the parent function	Base Exponential Function Exponential Growth Exponential Decay	Quarter 2 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		Determine the domain, range, and asymptote of exponential functions Solve exponential equations by writing with the same base	The value e	
Logarithmic Functions	Logarithmic expressions, equations, and functions	Express exponential expressions in logarithmic form and logarithmic expressions in exponential form Evaluate logarithmic expressions, to include natural and common logarithms Analyze logarithmic functions using transformations of the parent function Find inverses of both exponential and logarithmic functions Determine the domain, range, and asymptote of logarithmic functions Use properties of logarithms to expand and condense expressions Use the change of base formula Solve exponential equations using the logarithm and inverse relationship Solve logarithmic equations using the exponential form and inverse relationship, logarithmic properties, and setting logarithms with the same base equal	Base Logarithm Common Logarithm Natural Logarithm	Quarter 2 4 weeks
Conic Sections	Analyze, graph, and write equations of conic circles	Analyze and graph circles	Circle Ellipse	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		Analyze and graph equations of ellipses with center at the origin Analyze and graph equations of ellipses with center at (h,k) Analyze and graph equations of hyperbolas with center at the origin Analyze and graph equations of hyperbolas with center at (h,k) Analyze and graph equations of parabolas with vertex at the origin Analyze and graph equations of parabolas with vertex at (h,k) Write equations of conic sections in standard form by completing the square Solve word problems using conic sections	Major axis Vertex Endpoint Focus Hyperbola Transverse Axis Directrix Latus Rectum	
Triangle Trigonometry	Right Triangle Trigonometry Solving Oblique Triangle	Solve right triangles using Pythagorean theorem and the six trigonometric functions Solve oblique triangles using the laws of sines and cosines Solve real world problems using right triangle trigonometry, angles of elevation, angles of depression, directions and bearings, law of sines, law of cosines, indirect measurement	Sine Cosine Tangent Cotangent Secant Cosecant Direction/Bearing Angle of Elevation Angle of Depression Law of Sines Law of Cosines	Quarter 3 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
Angles and their Measures	Draw, convert, and use angle measures in degrees and radians	Draw angle measures in standard position Convert to and from degree decimals to degree minutes and seconds Convert to and from degrees to radians using the conversion factor $180=\pi$ Use arc length and area of a sector formulas to find the missing value	Radian Arc Length Area of a Sector	Quarter 3 2 weeks
Unit Circle Trigonometry	Angles measured in degrees and radians Unit Circle Trigonometry Trigonometric Identities Reference Angles	Evaluate the six trigonometric functions of an angle measure using a point on the unit circle Generate the unit circle using the quadrantal angles and special right triangles Use the unit circle to evaluate trigonometric expressions Simplify expressions of trigonometric functions at given angle measures Find reference angles given angle measures in degrees and radians Evaluate the six trigonometric functions using reference angles and the first quadrant chart	Unit Circle Reference Angle First Quadrant Chart Reciprocal Identities Quotient Identities Pythagorean Identities Coterminal Angles Complementary Angles	Quarter 3 4 weeks
Graphs of Trigonometric Functions	Analyze Sine and Cosine Curves, including domain, range, and transformations Identify tangent, cotangent, secant and cosecant curves, including domain and range	Determine the amplitude, period, phase shift, and vertical shift of sine and cosine curves Identify the range of sine and cosine curves Write sine and cosine equations of graphs of oscillating functions	Amplitude Period Phase Shift Oscillating	Quarter 4 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		Produce the graphs of the tangent, cotangent, secant, and cosecant curves using point plotting Recognize the tangent, cotangent, secant, and cosecant curves and determine the domain and range values		
Analytical Trigonometry	Trigonometric Identities Special Formulas - including Sum and Difference, Double Angle, Half Angle Inverse Trigonometry Trigonometric Equations	Prove that two trigonometric expressions are equal using the basic trigonometric identities Evaluate trigonometric expressions using the Sum and Difference Formulas and/or Double Angle formulas Evaluate inverse trig functions Solve trigonometric equations (including quadratic) to find both general solutions and solutions on a given interval	Reciprocal Identities Quotient Identities Pythagorean Identities Sum and Difference Formulas Double Angle Formulas Inverse Trigonometric Functions	Quarter 4 4 weeks

UPB Course Calendar/Outline:

	TOPIC
Week 1	Parent Functions and Transformations
Week 2	Slope, Point-Slope, Slope-Intercept Formulas Systems of Equations and Inequalities
Week 3	Analyzing Graphs of Polynomials (including Quadratic functions)
Week 4	Factoring, Synthetic and Long Division, and Rational Zero Theorem (to include complex zeros)
Week 5	Analyzing Rational Functions
Week 6	Graphing Rational Functions

Week 7	Chapter 1 Review and Test
Week 8	Functions and their Graphs (intercepts and symmetry)
Week 9	Composite Functions
Week 10	Inverse Functions
Week 11	Chapter 2 Review and Test
Week 12	Exponential Functions
Week 13	Transformations of Exponential Functions
Week 14	Logarithmic Functions
Week 15	Properties of Logarithmic
Week 16	Exponential and Logarithmic Equations
Week 17	Chapter 3 Review and Test
Week 18	Circles and Ellipses
Week 19	Hyperbolas
Week 20	Parabolas
Week 21	Chapter 4 Review and Test
Week 22	Right Triangle Trigonometry
Week 23	Laws of Sines and Cosines

Week 24	Law of Sines and Cosines – Ambiguous Case
Week 25	Chapter 5 Review and Test
Week 26	Angles and their Measures
Week 27	Evaluating Trig Functions – Unit Circle Approach
Week 28	Trigonometric Identities
Week 29	Evaluating Trig Functions – Reference Angles Approach
Week 30	Chapter 6 Review and Test
Week 31	The Sine and Cosine Curve
Week 32	Graphs of Tangent, Cotangent, Secant, and Cosecant
Week 33	Chapter 7 Review and Test
Week 34	Verifying Identities
Week 35	Sum & Difference and Double Angle Formulas
Week 36	Inverse Trig Functions
Weeks 37-8	Solving Trigonometric Equations
Week 39	Chapter 8 Review and Test
Week 40	Final Exam

Calculus

Statement of Organization:

This course is designed for students planning to take a college level math course while still in high school. Throughout the course, students will develop an understanding of limits, derivatives, integrals, and their applications. Students will improve their mathematical understanding through explorations, visual aids, and programs. Calculus meets for a minimum of one hundred twenty hours.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy – seven percent (77%) on all graded forms of assessment

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- drill and practice
- teacher observation
- projects
- teacher-made tests
- classroom discussions

Estimated Instructional Time:

Each section (1-4) below outlines a nine-week period of instruction.

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery. The big ideas are determined by the University of Pittsburgh at Bradford since this is a dual enrollment course.

Technology Integration:

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
Preview of Calculus	Analyze functions and their graphs Evaluate trigonometric functions	Use transformations to sketch functions Determine the domain of functions Find the x- and y-intercepts of functions Graph and write linear equations Find points of intersection Locate vertical asymptotes and/or holes of rational functions Simplify trigonometric expressions by using reference angles and the first quadrant chart/unit circle	Parent Functions Transformations Domain Intercepts Linear Equations Points of Intersection Vertical Asymptotes Undefined Holes First Quadrant Chart	Quarter 1 3 weeks
Limits and their Properties	Evaluate limits both graphically and algebraically, including one-sided and infinite limits Determine the cases where the limit does not exist Discuss continuity of functions	Evaluate limits using graphs and angles Evaluate limits using direct substitution, including the indeterminate form Discuss conditions of continuity Evaluate one-sided limits, including piece-wise functions Evaluate infinite limits using one-sided limits	Limit Indeterminate Form Continuity Discontinuity Removable Discontinuity Nonremovable Discontinuity Infinite Limits Limits at Infinity	Quarter 1 6 weeks
Derivatives	Find and apply the instantaneous rate of change using the derivative	Use the limit notation to find the derivative of a function Use the power, product, quotient, and chain rules to find the derivative of functions Differentiate trigonometric functions Apply the derivative to find the instantaneous rate of change at a given value	Derivative Differentiation Secant Line Tangent Line Normal Line	Quarter 2 6 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		Use the derivative to find the slope and/or equation of the tangent and normal lines Use implicit differentiation Apply the derivative to related rate problems		
Applications of the Derivative	Use the first and second derivative to analyze graphs of functions Apply the derivative to determine minimum or maximum values	Use the derivative to relate position, velocity, and acceleration functions Determine the differentiability of functions and relate to continuity Use the first derivative test to determine where functions are increasing and/or decreasing and locate extrema and extreme values Use the second derivative to determine concavity of a graph and find any points of inflection Apply the first and second derivative tests to minimize and/or maximize functions in real- world problems (optimization) Use the derivative and the tangent line to approximate functions at a given value Use the second derivative to determine whether an approximated value is over or under the actual value	Differentiability Critical Number Absolute Extrema Rolle's Theorem Mean Value Theorem Relative Extrema Concavity Points of Inflection Optimization	Quarter 2 5 weeks
Antiderivatives and Integration	Find and apply the antiderivative to find solutions, area, evaluate, and average value of a function	Use the antiderivative to find general and particular solutions Evaluate integrals using the definite integral Find the area under a curve using the definite integral and the fundamental theorem of Calculus	Antiderivative Integral Integration Constant of Integration General Solution Particular Solution	Quarter 3 7 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Pacing
		Find the average value of a function and value guaranteed by the Mean Value Theorem Use the second fundamental theorem of calculus to differentiate the integral Use change of variables to integrate functions	Definite integral Fundamental Theorem of Calculus Average Value of a Function Second Fundamental Theorem of Calculus	
Applications of the Integral	Use methods and application of the integral to calculate area, volume, and arc length	Use integration to find bounded area, including graphs that intersect Use the disk and washer method to find volumes of revolution about horizontal axis Use the shell method to find the volume of revolution about a vertical axis Determine the arc length of a curve on a given interval	Volume of Revolution Arc Length	Quarter 4 6 weeks
Differential Equations	Represent differential equations using slope fields, draw solution curves, and solve differential equations	Draw slope fields to represent differential equations Verify solutions to differential equations Find particular solutions	Slope Fields Differential Equations Initial Conditions Particular Solutions	Quarter 4 3 weeks

UPB Course Calendar/Outline:

	TOPIC
Week 1	Graphs and Models
Week 2	Linear Models and Rates of Changes
Week 3	Functions, Vertical Asymptotes, Evaluate Trig Functions

Week 4	Evaluating Limits Graphically
Week 5	Evaluating Limits Algebraically
Week 6	One-Sided Limits and Continuity
Week 7	Infinite Limits
Week 8	Limits at Infinity and Horizontal Asymptotes
Week 9	Review of Chapter 1 and Test
Week 10	Definition of the Derivative
Week 11	Basic Derivative Rules
Week 12	Product and Quotient Rules
Week 13	Trig Functions and Higher-Order Derivatives
Week 14	Trig Functions and Higher-Order Derivatives
Week 15	Chain Rule
Week 16	Chain Rule
Week 17	Implicit Differentiation
Week 18	Related Rates
Week 19	Chapter 2 Review and Test
Week 20	Absolute Extrema and Mean Value Theorem
Week 21	First Derivative Test and Extrema

Week 22	Concavity and Second Derivative Test
Week 23	Optimization
Week 24	Differentials and Linearization
Week 25	Chapter 3 Review and Test
Week 26	Antiderivatives and Particular Solutions
Week 27	Area bounded by x-axis
Week 28	Fundamental Theorem of Calculus
Week 29	Fundamental Theorem of Calculus and Mean/Average Value
Week 30	Integration using U-Substitution
Week 31	Chapter 4 Review and Test
Week 32	Bounded Area
Week 33	Disk and Washer Method
Week 34	Shell Method
Week 35	Arc Length
Week 36	Chapter 7 Review and Test
Week 37	Slope Fields and Differential Equations
Week 38	Final Exam

AP Calculus BC

Statement of Organization:

This advanced placement course is designed for students planning on doing college level work while still in high school. Throughout the course, students will develop an understanding of limits, derivatives, integrals, applications, and sequences and series. Students will improve their mathematical understanding through explorations, visual aids, and programs. AP Calculus meets every day for a minimum of 240 hours.

Expected Levels of Achievement:

All students are expected to master the objectives taught by achieving at least seventy-seven percent (77%) on all graded forms of assessment.

Methods of Evaluation:

Student competence will be assessed through the use of one or more of the following methods:

- Drill and practice
- Demonstration
- Teacher observation
- Projects
- Standardized tests
- Teacher-made tests
- Oral presentations
- Classroom discussions
- Progress Checks

Estimated Instructional Time:

Each section below outlines a nine-week period of instruction

Sequence

The Big Ideas/Reporting Categories are listed in order of delivery.

Technology Integration

In addition to print resources, students will use technology when available and applicable to achieve learning goals and generate products in conjunction with the standards.

Mathematical Practices

- 1.A Identify the question to be answered or problem to be solved.
- 1.B Identify key and relevant information to answer a question or solve a problem.
- 1.C Identify an appropriate mathematical rule or procedure based on the classification of a given expression.
- 1.D Identify an appropriate mathematical rule or procedure based on the relationship between concepts
- 1.E Apply appropriate mathematical rules or procedures with and without technology

- 2.A Identify common underlying structures in problems involving different contextual situations.
- 2.B Identify mathematical information from graphical, numerical, analytical, and/or verbal representations.
- 2.C Identify a re-expression of mathematical information presented in a given representation.
- 2.D Identify how mathematical characteristics or properties of functions are related in different representations.
- 2.E Describe the relationships among different representations of functions and their derivatives.

- 3.A Apply technology to develop claims and conjectures.
- 3.B Identify an appropriate mathematical definition, theorem, or test to apply.
- 3.C Confirm whether hypotheses or conditions of a selected definition, theorem, or test have been satisfied.
- 3.D Apply an appropriate mathematical definition, theorem, or test.
- 3.E Provide reasons or rationales for solutions and conclusions.
- 3.F Explain the meaning of mathematical solutions in context.
- 3.G Confirm that solutions are accurate and appropriate.

- 4.A Use precise mathematical language
- 4.B Use appropriate units of measure.
- 4.C Use appropriate mathematical symbols and notation.
- 4.D Use appropriate graphing techniques.
- 4.E Apply appropriate rounding procedures.

Big Ideas

CHA – Change

FUNC – Analysis of Functions

LIM - Limits

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
Previous of Calculus	Analyze functions and their graphs Evaluate trigonometric functions	Use transformations to sketch functions Determine the domain and range of functions Find x- and y- intercepts of functions Find points of intersection of two graphs Locate vertical asymptotes and/or holes of rational functions Simplify trigonometric expressions using reference angles and the first quadrant chart/unit circle	Parent Functions Domain Range Intercepts Points of Intersection Vertical Asymptotes Undefined Holes Sine Cosine Tangent		Quarter 1 1 week
Limits and Continuity	Interpret the rate of change at an instant in terms of average rates of change over intervals containing that instant Represent limits analytically using correct notation Interpret limits expressed in analytic notation Estimate limits of functions	Introducing Calculus: Can change occur at an instant? Defining limits and using limit notation Estimating limit values from graphs Estimating limit values from tables Determining limits using algebraic properties of limits Determining limits using algebraic manipulation	Limit Squeeze Theorem Removable Discontinuity Non-removable Discontinuity Infinite Limits Limits at Infinity Horizontal Asymptote Intermediate value Theorem	2.B 1.E 1.C 3.C 2.C 3.B 2.D 3.E	Quarter 1 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Determine the limits of functions using limit theorems Determine the limits of functions using equivalent expressions for the function or the squeeze theorem Justify conclusions about continuity at a point using the definition Determine intervals over which a function is continuous Determine values of x or solve for parameters that make discontinuous functions continuous, if possible Interpret the behavior of functions using limits involving infinity Explain the behavior of a function on an interval using the Intermediate Value Theorem	Determining limits using the Squeeze Theorem Exploring types of discontinuities Defining continuity at a point Confirming continuity over an interval Removing discontinuities Connecting infinite limits and vertical asymptotes Connecting limits at infinity and horizontal asymptotes Working with the Intermediate Value Theorem			
Differentiation: Definition and Basic Derivative Rules	Determine the average rates of change using difference quotients	Defining average and instantaneous rates of change at a point	Average rate of change Secant Line	2.B 1.D	Quarter 1 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Represent the derivative of a function as the limit of a difference quotient Determine the equation of a line tangent to a curve at a given point Estimate derivatives Explain the relationship between differentiability and continuity Calculate derivatives of familiar functions Interpret the limit as a definition of a derivative Calculate derivatives of products and quotients of differentiable functions	Defining the derivative of a function using derivative notation Estimating derivatives of a function at a point Connecting differentiability and continuity: determining when derivatives do and do not exist Apply the power rule Derivative rules: constant, sum, difference, and constant multiple Derivatives of cosine, sine, e^x, and $\ln x$ Apply the product and quotient rule Finding the derivatives of tangent, cotangent, secant, and/or cosecant functions	Derivative Instantaneous rate of change Tangent Line Normal Line Vertical Tangent Line Cusp	4.C 1.E 3.E	
Differentiation: Composite, Implicit, and Inverse Functions	Calculate the derivatives of compositions of differentiable functions Calculate derivatives of implicitly defined functions Calculate the derivatives of inverse and inverse trigonometric functions	The chain rule Implicit differentiation Finding the derivative of inverse functions Finding the derivative of inverse trig functions	Composite Function Inverse Functions Implicit Form	1.C 1.E 3.G	Quarter 1 2 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Determining higher-order derivatives of a function	Calculating higher-order derivatives			
Contextual Applications of Differentiation	Interpret the meaning of a derivative in context Calculate rates of change in applied contexts Calculate related rates in applied contexts Approximate a value on a curve using the equation of a tangent line Determine the limits of functions that result in determinate forms	Interpreting the meaning of the derivative in context Straight-line motion: Connecting position, velocity, and acceleration Rates of change in applied contexts other than motion Solve related rate problems Approximating values of a function using local linearity and linearization Using L'Hôpital's rule for determining limits of indeterminate forms	Position Velocity Acceleration Linear approximation Indeterminate form	1.D 1.E 2.A 3.F 1.F 3.D	Quarter 1 2 weeks
Analytical Applications of Differentiation	Justify conclusions about functions by applying the Mean Value Theorem over an interval Justify conclusions about functions by applying the Extreme Value Theorem Justify the conclusions about the behavior of a function based on the behavior of its derivatives	Using the Mean Value Theorem Extreme Value Theorem, global vs. local extrema, and critical points Determining intervals on which a function is increasing or decreasing Using the first derivative test to determine relative (local) extrema Using the candidates test to determine absolute (global) extrema	Mean value theorem Extreme value theorem Extrema Minima Maxima Absolute (global) extrema Relative (local) extrema Critical points Horizontal tangent line Concavity	3.E 2.E 3.D 1.E 2.D 2.A 3.F 1.E	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Calculate minimum and maximum values in applied contexts or analysis of functions Determine critical points of implicit relations Justify conclusions about the behavior of an implicitly defined function based on evidence from its derivatives	Determining concavity of functions over their domains Using the second derivative test to determine extrema Sketching graphs of functions and their derivatives Connecting a function, its first derivative, and its second derivative Solve optimization problems Explore behaviors of implicit relations	Inflection point optimization		
Integration and Accumulation of Change	Interpret the meaning of areas associated with the graph of a rate of change in context Approximate a definite integral using geometric and numerical methods Interpret the limiting case of the Riemann sum as a definite integral Represent the limiting case of the Riemann sum as a definite integral Represent accumulation functions using definite integrals	Exploring accumulations of change Approximating areas with Riemann Sums Riemann Sums, summation notation, and definite integral notation The fundamental theorem of calculus and accumulation functions Interpreting the behavior of accumulation functions involving area Applying properties of definite integrals The fundamental theorem of calculus and definite integrals	Accumulation of change Riemann sums Sigma Integral Definite integral Fundamental theorem of calculus Indefinite integral Antiderivative Average value of a function Second fundamental theorem of calculus Partial fractions Improper Integrals Converge Diverge	4.B 1.F 2.C 1.D 2.D 3.D 4.C 1.E 1.C	Quarter 2 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Calculate a definite integral using areas and properties of definite integrals Evaluate definite integrals analytically using the Fundamental Theorem of Calculus Determine antiderivatives of functions and indefinite integrals, using knowledge of derivatives For integrands requiring substitution, rearrangements into equivalent forms, , integration by parts, or partial fractions, (a) determine indefinite integrals, and (b) evaluate definite integrals Evaluate an improper integral or determine that the integral diverges	Finding antiderivatives and indefinite integrals: basic rules and notation Integrating using substitution Integrating functions using long division and completing the square Integrating using integration by parts Integrating using linear partial fractions Evaluating improper integrals			
Differential Equations	Interpret verbal statements of problems as differential equations involving a derivative expression	Modeling situations with differential equations Verifying solutions for differential equations	Differential equation Slope field Solution curve Initial Condition Particular Solution	2.C 3.G 4.D	Quarter 2 3 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Verify solutions to differential equations Estimate solutions to differential equations Determine general solutions to differential equations Determine particular solutions to differential equations Interpret the meaning of a differential equations and its variables in context Determine general and particular solutions for problems involving differential equations in context Interpret the meaning of the logistic growth model in context	Sketching slope fields Reasoning and using slope fields Approximating solutions using Euler's method Finding general solutions using separation of variables Exponential models with differential equations Logistic models with differential equations	Euler's method Separation of variables Exponential growth Exponential decay Newton's law of cooling Logistic growth Carrying capacity	1.E 3.F	
Applications of Integration	Determining the average value of a function using definite integrals Determine values of positions and rates of change using definite integrals in problems involving rectilinear motion	Finding the average value of a function on an interval Connecting position, velocity, and acceleration of functions using integrals Using accumulation functions and definite integrals in applied contexts	Average Value of a Function Volume of Revolution Cross Sections Arc Length	1.E 1.D 3.D 4.C 2.B	Quarter 3 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Interpret the meaning of a definite integral in accumulation problems Determine net change using definite integrals in applied contexts Calculate areas in the plane using the definite integral Calculate volumes of solids with known cross sections using definite integrals Calculate volumes of solids of revolution using definite integrals Determine the length of a curve in the plane defined by a function, using a definite integral	Finding the area between curves expressed as functions of x and functions of y Finding the area between curves that intersect at more than two points Volumes with cross sections: squares, rectangles, triangles, and semicircles Volume with Disc Method: Revolving around the x- or y-axis Volume with Disc Method: Revolving around other axes Volume with Washer Method: Revolving around the x- or y-axis Volume with Washer Method: Revolving around other axes Volume with the Shell Method: revolving around y-axis and other vertical lines The arc length of a smooth, planar curve, and distance traveled		2.D 4.E	
Parametric Equations, Polar Coordinates, and Vector-Valued Functions	Calculate derivatives of parametric functions Determine the length of a curve in the plane defined	Defining and differentiating parametric equations Second derivatives of parametric equations	Parameters Parametric Equations Planar Curve Vector-valued functions	2.D 1.E 1.D	Quarter 3 4 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	by parametric functions, using a definite integral Calculate derivatives of vector-valued functions Determine a particular solution given a rate vector and initial conditions Determine values for positions and rates of change in problems involving planar motion Calculate derivatives of functions written in polar coordinates Calculate areas of region defined by polar curves using definite integrals	Finding arc lengths of curves given by parametric equations Defining and differentiating vector-valued functions Integrating vector-valued functions Solving motion problems using parametric and vector-valued functions Defining polar coordinates and differentiating in polar form Find the area of a polar region or the area bounded by a single polar curve Finding the area of the region bounded by two polar curves	Polar coordinates Poles Polar form	3.D	
Infinite Sequences and Series	Determine whether a series converges or diverges Approximate the sum of a series Represent a function at a point as a Taylor polynomials Approximate function values using Taylor polynomials	Defining convergent and divergent infinite series Working with geometric series The nth term test for divergence Integral test for convergence Harmonic series and p-series Comparison tests for convergence Ratio test for convergence	Sequence Infinite series Divergence Convergence Error bound Radius of convergence Interval of convergence Power series	3.D 3.B 1.E 2.C 1.F	Quarter 5 5 weeks

Big Idea/Reporting Category	Concepts/Standards	Competencies/Eligible Content	Vocabulary	Standards	Pacing
	Determine the error bound associated with a Taylor polynomial approximation Determine the radius of convergence and interval of convergence for a power series Represent a function as a Taylor series or a Maclaurin series Interpret Taylor series and Maclaurin series Represent a given function as a power series	Determining absolute and conditional convergence Alternating series error bound Finding Taylor polynomial approximations of functions Lagrange error bound Radius and interval of convergence of power series Finding Taylor or Maclaurin series for a function Representing functions as power series			