

**Correlations of the TEN UNDERSTANDING MATHEMATICS Programs  
By Neufeld Learning Systems  
February 2004**

**Note: a. The Understanding Math series of programs consist of 10 programs written for Kindergarten to 10<sup>th</sup> Grade.**

**The 10 programs are:**

Understanding Fractions	Understanding Integers	Understanding Probability
Understanding Percent	Understanding Exponents	Understanding Equations
Understanding Algebra	Understanding Graphing	Understanding Numeration
Understanding Measurement and Geometry		

**Note: b. The Understanding Numeration** software for K to 3 is set up so that the teacher selects items in the following order:

Concept .. from 5 concepts .. Counting, Comparing & Ordering, Place Value, Operations and Problem Solving.

Skill .. chosen from the list of specific learning expectations

Level .. indicates the levels of development for Kindergarten to 3<sup>rd</sup> grade.

Level	Upper Range of Number
<b>A</b>	<b>10</b>
<b>B</b>	<b>20</b>
<b>C</b>	<b>100</b>
<b>D</b>	<b>1000</b>

Lesson .. 250 lessons are sequenced to build understanding of concepts.

A detailed Lesson Synopsis on the website [www.neufeldmath.com](http://www.neufeldmath.com) to assist the teacher by stating the lesson contents but also by giving lesson suggestions.

Worksheet .. off computer worksheets are selected from the CD by a code.

**Note: c. The remaining 9 Understanding Math** programs for 4<sup>th</sup> to 10<sup>th</sup> grade are set up so that they can be used in a variety of teaching and learning environments ranging from a teacher centered approach with 1 computer to a student centered lab approach. The lessons can also be used in remediation, tutorial, intervention, resource, fast-tracking.

Each topic has:

- ..an interactive concept introduction, usually with a variety of graphic approaches.
- ..a number of particular examples
- ..practice questions with random questions but particular feedback
- ..a topic test with random questions and tracking
- ..off computer worksheets selected from the website .. [www.neufeldmath.com](http://www.neufeldmath.com)

### **Grade 3**

By the end of grade three, students will understand place value and deepen their understanding of and their skills with addition and subtraction with whole numbers and decimals, and multiplication and division of whole numbers. Students will understand the concepts of weight, time and length. Students will also understand the properties of and the relationship between geometric figures. Students will collect, represent and analyze data to answer questions.

#### **Numbers and Operations**

The student will use decimal fractions and common fractions to represent the size of quantities. The student will understand the meanings of multiplication and division of whole numbers and compute/utilize them in basic calculations, as well as appreciate their usefulness and apply them in problem solving situations.

#### **M3N1. The student will deepen their understanding of whole numbers and ways of representing them.**

- a. Know place value through of ten thousands.
- b. Understand the relative sizes in place value, 10 times, 100 times, 1/10 of a whole number and how to represent them.

NUM / PLACE VALUE / Identify Place Value Patterns (to 1000) / C / 3 Digit Numbers – Different Ways

NUM / PLACE VALUE / Identify Place Value Patterns (to 1000) / D / Expanded Notation

#### **M3N2. The student will add and subtract whole numbers and develop the ability to use them.**

- a. Utilize the properties of addition and subtraction and check the results of computation.

NUM / OPERATIONS / Add 3 Digit Numbers...Concretely / D / Addition Without Regrouping; Addition With Regrouping

NUM / OPERATIONS / Add 3 Digit Numbers...Abstractly / D / Addition Without Regrouping; Addition With Regrouping

NUM / OPERATIONS / Subtract 3 Digit Numbers...Concretely / D / Subtraction Without Regrouping; Subtraction With Regrouping

NUM / OPERATIONS / Subtract 3 Digit Numbers...Abstractly / D / Subtraction Without Regrouping; Subtraction With Regrouping

#### **M3N3. The student will deepen their understanding of the multiplication of whole numbers and develop the ability to use it.**

- a. Know the multiplication facts with automaticity to  $10 \times 10$ .

NUM / OPERATIONS / Introduce Multiplication Facts...2,3,4,5 / C / Multiplication: Groups of 2; Multiplication: Groups of 3 ; Multiplication: Groups of 4 ; Multiplication: Groups of 5

NUM / OPERATIONS / Introduce Multiplication by 1 and by 0 / C / Multiplication: Groups of 1; Multiplication: Groups of 0

NUM / OPERATIONS / Introduce Multiplication Facts...6,7,8,9 / C / Multiplication: Groups of 6; Multiplication: Groups of 7; Multiplication: Groups of 8; Multiplication: Groups of 9

NUM / OPERATIONS / Patterns in Multiplication / D / X Table – Groups of 6; X Table – Groups of 7; X Table – Groups of 8; X Table – Groups of 9; X Table – Groups of 10

**NUM / OPERATIONS / Note Patterns in 10 X 10 Multiplication Table / D /** X Table – Patterns in Rows; X Table – Patterns in Columns; X Table – Other Patterns; X Table – User Picks; X Table – Computer Picks

b. Use array models to demonstrate multiplying a 2- or 3- digit number by a 1- or a two-digit number.

**NUM / OPERATIONS / Introduction to Arrays / C /** Introduce Arrays with Multiplication; Build Arrays with Multiplication

c. Understand how to multiply 2- or 3- digit numbers by 1- or 2- digit number without a calculator.

d. Understand that multi-digit multiplication is based on the multiplication table and the properties of operations and multiply 2- or 3- digit numbers by 1- or 2- digit numbers.

**NUM / OPERATIONS / Note Patterns in 10 X 10 Multiplication Table / C /** All Sections

e. Know the identity, commutative and associative properties of multiplication and to use them in computation and checking the results.

**NUM / OPERATIONS / Demonstrate Commutative Property / C /** Multiplication – Any Order

**M3N4. The student will understand the meaning of division and develop the ability to use it.**

a. Recognize problem-solving situations in which division may be applied and express them as mathematical expressions.

**Understanding Integers / Topic 5 /** Word Problems: Casino; Plant; Graham’s Walk; Practice Questions

b. Understand the relationship between division and multiplication and between division and subtraction. Explain the meaning of remainder in division.

**Understanding Integers / Topic 5 /** Division to Multiplication; The Division Table; The Inverse of Multiplication

c. Compute long division problems using 1- digit divisors.

**M3N5. The student will understand the meaning of decimal fractions and common fractions in simple cases and appropriately use them in problem solving situations.**

a. Use decimals or fractions to represent the size of parts created by equally dividing a whole. Know the notations of decimals and fractions.

**NUM / COUNTING / Introduce Common Fraction as Parts of a Whole / B /** One Half of a Shape; Two Thirds of a Shape; Three Quarters of a Shape; Cut in Half; Fifths to Tenths #1

**NUM / COUNTING / Introduce Common Fraction as Parts of a Whole / C /** Fifths to Tenths #2; Write the Fraction

**NUM / COUNTING / Introduce Fraction of a Set / C /** Fraction of a Set

**NUM / COUNTING / Introduce Decimals / D /** Tenths and Decimals; Ones and Tenths

b. Know that addition and subtraction can also be applied to decimals and fractions with like denominators in pictures and problems

**Understanding Fractions / Topic 7 /** Patterns Blocks; Fraction Strips; Decimal Strips

**M3N6. The student will develop flexibility in solving problems by selecting strategies and using mental computation, calculators, and pencil and paper.**

NUM / PROBLEM SOLVING

### **Measurement**

The student will understand the concepts of weight and time and measure the quantities of length through appropriately choosing units and tools according to their purposes.

**M3M1. The student will understand the concept of weight and measure it.**

- a. Understand the measuring of weight using units of measure.
- b. Know the units (gram (g) and kilogram (kg), ounces (oz), pounds (lbs) and tons) to be used in measuring weight.

**M3M2. The student will measure length by appropriately choosing units and tools.**

- a. Know the units (kilometer and mile) to be used in measuring distance (length).

**Understanding Measurement and Geometry / Topic 1 / Metric and U.S.A. Standard Measurement System**

- b. Use appropriate tools to measure to the nearest  $\frac{1}{4}$ ".

**Understanding Measurement and Geometry / Topic 1 / Metric and U.S.A. Standard Measurement System: The Ruler**

- c. Estimate length and represent it by using appropriate units.

**Understanding Measurement and Geometry / Topic 1 / Benchmarks**

**M3M3. The student will deepen their understanding of the concept of time and determine elapsed time on the full, half and quarter-hour.**

NUM / COMPARING AND ORDERING / Describe Elapsed Time...Hours, 5 Minutes / C /

Elapsed Time in Hours; Elapsed Time – 5

NUM / COMPARING AND ORDERING / Describe Elapsed Time...Minutes / D / Time Goes By – Analog; Time Goes By – Digital; Elapsed Time – Minutes #1; Elapsed Time – Minute #2

### **Geometry**

The student will deepen their understanding of characteristics of fundamental geometric figures and construct and use them.

**M3G1. The student will deepen their understanding of fundamental geometric figures and construct or use them.**

- a. Construct and use fundamental geometric figures including isosceles and equilateral triangles.

**Understanding Measurement and Geometry / Topic 2 / Polygons...What are They?: A Triangle is**

- b. Relate angles to fundamental geometric figures.

**Understanding Measurement and Geometry / Topic 2 / Polygons...What are They?**

- c. Identify the center, diameter and radius of a circle.

**Understanding Measurement and Geometry / Topic 3 / Circles All Around Us; Radius, Circumference, Diameter**

## **Algebra**

The student will understand how to express data as mathematical expressions and graphs and examine how the scale sizes affect the representation of relationships.

### **M3A1. The student will use mathematical expressions to represent relationships between quantities and interpret given expressions.**

a. Describe and extend numeric and geometric patterns.

**Understanding Algebra / Topic 1** / Trick #1: Instructions, Trick Machine, Explanation; Trick #2: Instructions, Explanation; Trick #3: Instructions, Examples; Pictures to Words: Pictures to Words, More Pictures to Words; Summary; Practice Questions

b. Describe a quantitative relationship represented by a formula and be able to explain it.

**Understanding Algebra / Topic 2** / Area: Area...The Concept, area...Examples 1-3; Introduction to Tiles: Tiles Representation, Like Terms, Combinations, Squared Terms; Pictures to Words to Algebraic Expressions: Examples 1& 2

c. Use symbols to represent an unknown and to find the value of the unknown in a number sentence.

**Understanding Algebra / Topic 2** / Pictures to Words to Algebraic Expressions: Examples 1& 2

### **M3A2. The student will create simple tables and graphs and interpret their meaning.**

a. Organize and display data in bar graphs and tables to solve problems.

b. Know how to interpret and draw bar graphs, using increments of 1, 2, 5 and 10 in the scale.

Pictures to Words to Algebraic Expressions: Examples 1& 2

**Understanding Graphing / Topic 1** / All Sections

**Understanding Graphing / Topic 2** / Data...What is it? ; An Introduction...Examples of Data; Collecting Data; Presenting Data: Bar Graph, Examples 1-2

## **Grade 4**

By the end of grade four, students will write, add and subtract decimal fractions and common fractions. Students will understand how and when to use rounding. Students will know and use common measurement units to determine length and area. Students will also know and use formulas to determine the volume of simple geometric figures. Students will deepen their understanding of measuring volume and angles with appropriate units and tools. Students will understand the characteristics of geometric plane figures and solid figures and how to represent the position of these figures. Students will also use tables, graphs and charts to record and analyze data.

## **Numbers and Operations**

The student will deepen their understanding of whole numbers, master the four basic operations with whole numbers, and effectively solve problems. The student will understand rounding numbers and when to apply rounding. The student will write, add and subtract decimal fractions and common fractions.

**M4N1. The student will deepen their understanding that whole numbers are represented by the base-ten numeration system.**

- a. Know about the units through one million and summarize the base-ten numeration system.

NUM / PLACE VALUE / Identify Place Value Patterns (to 1000) / D / Expanded Notation

**M4N2. The student will understand rounding numbers and use them appropriately.**

- a. Describe situations in which rounding numbers is appropriate.
- b. Understand the meaning of rounding a decimal fraction to the nearest whole number.

Understanding Fractions / Topic 13 / Rounding: Examples 1-2

- c. Represent the results of computation as a rounded number when appropriate and estimate the sum or difference by rounding numbers.

**M4N3. The student will accurately multiply whole numbers without calculators and multiply in problem solving situations.**

Understanding Integers / Topic 4 / Word Problems

**M4N4. The student will deepen their understanding of the meaning of division of whole numbers and divide in problem solving situations without calculators.**

- a. Explain why division is possible even when the divisor is a 2-digit number and understand how to carry out the operation.
- b. Summarize the following relation:  $(\text{dividend}) = (\text{divisor}) \times (\text{quotient}) + (\text{remainder})$
- c. Explain why the quotient is not changed if divisor and dividend are multiplied or divided by the same number ( $2050 \div 50 \approx 205 \div 5$ )

**M4N5. The student will deepen their understanding of the meaning of decimal fractions and compute in decimals.**

- a. Know that the system of representation of decimals is the same as of whole numbers and that both are part of the base-ten system.

NUM / COUNTING / Introduce Decimals / D / Tenths and Decimals; Ones and Tenths

- b. Deepen their understanding of relative size of numbers including ordering decimals.

NUM / COMPARING AND ORDERING / Compare Decimals / D / Compare Decimals

- c. Add and subtract in decimals.
- d. Multiply and divide in cases where the multiplier and divisor are whole numbers.

**M4N6. The student will deepen their understanding of the meaning of fractions and compute fractions in simple cases.**

- a. Deepen their understanding of the representation and meaning and introduce simple equivalent fractions.

Understanding Fractions / Topic 3 / Introduction; Pattern Blocks; Fractions Strips; Equivalent Fractions on a Number Line; Comparison of Fractions

b. Add and subtract fractions and mixed numbers with common denominators.  
**Understanding Fractions / Topic 7** / Pattern Blocks; Fraction Strips; Percent Strips; Decimal Strips; The Clock; Add Fractions on a Number Line

**Understanding Fractions / Topic 8** / Pattern Blocks; The Clock; Fraction Strips; Percent Strips; Decimal Strips; Subtract Fractions on a Number Line

c. Convert mixed numbers to improper fractions and the reverse.

**Understanding Fractions / Topic 12** / The Concept; Improper Fractions and Mixed Numbers... What are They?; Introductory Problem; Mixed to Improper; Improper to Mixed

**M4N7. The student will explain the meanings and properties of the four fundamental operations and adequately use and check the operations in problem solving situations.**

a. Explain their understanding of the situations in which the four operations may be used and the relationships among them.

**Understanding Integers / Topics 3, 4, 5, 6** / Word Problems

b. Compute using the commutative, associative and distributive properties.

**M4N8. The student will use a calculator in problems solving situations or in complex computations.**

### **Measurement**

The student will understand the concept of area and measure the area of simple geometric figures and the size of an angle. The student will measure the quantities of volume through appropriately choosing units and tools.

**M4M1. The student will understand the concept of area and measure the area in simple cases.**

a. Understand the meaning of unit and measurement in area.

b. Know the units (square inch ( $\text{in}^2$ ), square foot ( $\text{ft}^2$ ) and square mile ( $\text{mi}^2$ )) to be used in measuring area.

c. Measure the area of squares and rectangles by tiling.

**Understanding Measurement and Geometry / Topic 2** / Amount of Surface; Area of a Parallelogram; Area of a Triangle

**M4M2. The student will deepen their understanding of the concept of angle and measure it.**

a. Use unit degree ( $^\circ$ ) in measuring angle.

**Understanding Measurement and Geometry / Topic 5** / Angles... An Introduction; The Degree

b. Understand the meanings and measure of half-rotation and full-rotation.

**Understanding Graphing / Topic 4** / Rotations; Object to Image

**M4M3. The student will measure volume through appropriately choosing units and tools.**

- a. Know the units to be used in measuring volume (milliliters, liters, fluid ounces, cups, pints, quarts, and gallons).

## **Geometry**

The student will understand the characteristics of fundamental geometric plane figures and fundamental solid figures and how to represent the position of these objects.

### **M4G1. The student will deepen their understanding of fundamental plane figures through examining and constructing geometric figures. The student will define and identify the characteristics of geometric figures.**

- a. Describe parallelism and perpendicularity of lines as they relate to plane geometric figures.

**Understanding Measurement and Geometry / Topic 6 / Parallel Lines; Example with Parallel Lines**  
**Understanding Measurement and Geometry / Topic 7 / Perpendicular Bisector; Perpendicular from Point on Line; Perpendicular from Point off Line**

- b. Examine parallelograms (including squares and rectangles), trapezoids, rhombuses, etc.

**Understanding Measurement and Geometry / Topic 2 / Area of a Parallelogram**  
**Understanding Measurement and Geometry / Topic 4 / Classifying Solids**

- c. Understand the relationship among quadrilaterals through construction.

- d. Understand congruence of geometric figures and the correspondence of vertices, sides and angles in congruent figures.

**Understanding Measurement and Geometry / Topic 4 / Classifying Solids**  
**Understanding Measurement and Geometry / Topic 5/ Angles...An Introduction**

### **M4G2. The student will understand fundamental solid figures (3-D space) through constructing a model and examining its component parts and consider the space in simple cases. The student will compare solid figures to plane figures.**

- a. Compare and contrast a cube and a rectangular prism.

**Understanding Measurement and Geometry / Topic 4 / Classifying Solids: A Solid is...**

- b. Describe parallelism and perpendicularity of lines and planes in connection with the rectangular prism.

**Understanding Measurement and Geometry / Topic 8 / Orthographic Projections: Introduction; The Cube Tool; Given Solid – Build it**

### **M4G3. The student will use a coordinate system to specify the location of an object in space.**

**Understanding Measurement and Geometry / Topic 8 / Orthographic Projections: Introduction; The Cube Tool; Given Solid – Build it**

**Understanding Graphing / Topic 3 / Shapes**

## **Algebra**

The student will represent the mathematical relationships between quantities using mathematical expressions and graphs. The student will investigate and display the relationship between the quantities in problem solving situations.

*Neufeld Learning Systems, February 2004*

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**M4A1. The student will represent and investigate the relationship between two quantities that vary with each other.**

- a. Investigate relationships in which quantities change in proportion to each other.  
**Understanding Graphing / Topic 4 /** In This Topic; What is a Transformation?; Introduction to Common Transformations

**M4A2. The student will concisely represent mathematical relationships in quantitative expressions and interpret those expressions.**

- a. Use the order of operations, including parentheses, to correctly compute results.  
**Understanding Fractions / Topic 11 /** All Sections
- b. Understand how a formula can be used to describe relationships.  
**Understanding Algebra / Topic 3 /** Introduction ...Math is Patterns; Expressions, Terms, Variables; Examples...Patterns to Formulas
- c. Represent unknowns using symbols, write mathematical expressions and evaluate them using different values.  
**Understanding Algebra / Topic 3 /** Substitution is ...Math Scrabble; Substitution Examples; Practice Questions; Topic Test

**M4A3. The student will gather, organize, and display data according to their purposes and investigate their features.**

- a. Investigate all possible cases given two sets of data.  
**Understanding Graphing / Topic 2 /** Data...What is it?; An Introduction; Statistics...What is it?
- b. Identify omissions and duplications in data.  
**Understanding Graphing / Topic 2 /** Collecting Data
- c. Represent the data in bar, line and pictographs and to investigate the features and tendencies of these graphs.  
**Understanding Graphing / Topic 2 /** Presenting Data; Bar Graph; Line Graph

**Grade 5**

By the end of fifth grade, students will deepen their understanding of multiplication and division of decimal fractions and whole numbers. Students will deepen their understanding of measuring the volume and area of simple geometric figures and understand the meaning of congruence of geometric shapes. Students will understand and investigate algebraic mathematical expressions. Students will use percentages and circle graphs to interpret statistical data.

**Numbers and Operations**

The student will understand the meanings of multiplication and division of decimal fractions and compute in decimals and fractions, as well as make use of them in problem solving situations. The student will deepen their understanding of the concept of whole numbers.

**M5N1. The student will deepen their understanding of whole numbers.**

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a. Know that the set of whole numbers may be classified into subsets with distinguishing characteristics (odd/even, prime/composite).

b. Know about multiples, factors, and divisibility.

**Understanding Percent / Topic 2** / Expressing a Fraction in Simplest Form; GCF – Examples 1, 2; Reducing Fractions – Methods 1, 2; Examples 1-4

**M5N2. The student will deepen their understanding of both whole numbers and decimal fractions as part of the base-ten number system.**

c. Make the multiples of a number multiplied by 10, 100,  $\frac{1}{10}$  or  $\frac{1}{100}$  by moving the decimal point.

**Understanding Fractions / Topic 13** / Decimals to Fractions – Place Value; Examples 1 - 5

**Understanding Measurement and Geometry / Topic 1** / Metric and U.S.A. Standard Measurement Systems: Converting Between Metric Units

**M5N3. The student will deepen their understanding of the meaning of multiplication and division in decimal fractions and develop the ability to use them.**

a. Explain the meaning of multiplication and division, including situations in which the multiplier and divisor are decimal fractions.

**Understanding Fractions / Topic 13** / Compare Fractions; Fractions to Decimals; Repeating Decimals; Decimals to Fractions; Fraction to Decimal Division Table

b. Know how to carry out multiplication and division of decimal fractions.

c. Understand that the same relationships and rules for multiplication and division of whole numbers also apply to decimal fractions.

**Understanding Fractions / Topic 9** / All Sections

**Understanding Fractions / Topic 10** / All Sections

**M5N4. The student will deepen their understanding of the meaning of fractions and develop their abilities to compute with fractions.**

a. Understand that the result of division of whole numbers can be represented as a single number by using fractions.

**Understanding Fractions / Topic 10** / All Sections

b. Transform fractions into decimals and represent whole numbers and decimals as fractions.

**Understanding Fractions / Topic 13** / All Sections

c. Understand that the value of a fraction is not changed when both its numerator and denominator are multiplied or divided by the same number (finding equivalent fractions and simplifying fractions).

**Understanding Fractions / Topic 3** / All Sections

d. Model the multiplication of common fractions and accurately compute products.

**Understanding Fractions / Topic 3** / Equivalent Fractions in a Multiplication Table

e. Explain the process for ordering fractions by size.

**Understanding Fractions / Topic 3** / Equivalent Fraction on a Number Line; Comparison of Fractions

**M5N5. The student will estimate the size of a product or a quotient.**

### **Measurement**

The student will measure the area of fundamental geometric plane figures, and further, understand the concept of volume and measure the volume of simple geometric figures.

**M5M1. The student will deepen their understanding that the area of fundamental geometric plane figures may be found by computation and measuring the area.**

a. Find the area of a polygon by converting it into squares or rectangles.

**Understanding Measurement and Geometry / Topic 2 / Amount of Surface Area: The Driveway, Area – Estimation, Area of a Rectangle, Concept, Examples 1,2**

b. Find the area of triangles, parallelograms and trapezoids using tiling and formulas.

**Understanding Measurement and Geometry / Topic 2 / Area of a Parallelogram; Area of a Triangle**

c. Determine the area of a circle.

**Understanding Measurement and Geometry / Topic 3 / Area of a Circle; Recall Area; Area Exploration #1, #1; Examples 1 through 5; Practice Questions**

**M5M2. The student will understand the concept of volume and measure the volume in simple cases.**

a. Understand the meaning of the unit of measurement for volume ( $u^3$ ).

b. Identify the units, cubic centimeter ( $cm^3$ ) and cubic meter ( $m^3$ ), cubic inch ( $in^3$ ), cubic foot ( $ft^3$ ), and cubic yard ( $yd^3$ ), used in measuring volume.

c. Measure the volume of a cube and a rectangular prism.

d. Compare and contrast volume and capacity.

**Understanding Measurement and Geometry / Topic 4 / Volume of a Solid**

**M5M3. The student will use estimation to deepen their understanding of size and strengthen the understanding of the meaning of measured values.**

a. Approximate the size of a given figure by converting it into known geometric figures and to roughly estimate the length, area, or volume of the given figure.

### **Geometry**

The student will understand the meaning of congruence and its relationship to the characteristics of fundamental geometric shapes.

**M5G1. The student will deepen their understanding of fundamental plane figures by examining and constructing geometric figures.**

a. Determine shape and size of a geometric figure by identifying its characteristics.

**Understanding Measurement and Geometry / Topic 2 / Polygons...What are They?**

**Understanding Measurement and Geometry / Topic 4 / Classifying Solids**

b. Identify the simple properties of geometric figures through investigation and construction.

**Understanding Measurement and Geometry / Topic 8 / Orthographic Projections: Introduction; The Cube Tool; Given Solid – Build it; Given Views; Build it**

c. Understand the meaning of the ratio of the circumference of a circle to its diameter.  
**Understanding Measurement and Geometry / Topic 3 / Radius, Circumference, Diameter; PI...A**  
Special Number; Circumference of a Circle

### **Algebra**

The student will algebraically represent mathematical expressions by using letters and investigate the mathematical relationships represented by them. The student will understand statistical data by using percentage and circle graphs.

#### **M5A1. The student will understand the meaning of percentage.**

**Understanding Percent / Topic 1 / All Sections**

**Understanding Percent / Topic 5 / All Sections**

#### **M5A2. The student will compare and contrast different representations of the same data and discuss the advantages of each.**

**Understanding Percent / Topic 2 / All Sections**

**Understanding Percent / Topic 3 / All Sections**

#### **M5A3. The student will represent and interpret the relationships between quantities concisely and generalize to algebraic expressions.**

a. Determine that the relationship represented by a formula holds true and whether the involved numbers are whole numbers or decimal fractions.

b. Identify letters such as  $n$  or  $x$  may stand for quantities and investigate simple algebraic expressions by substituting numbers for the unknown.

**Understanding Algebra / Topic 3 / All Sections**

#### **M5A4. The student will organize data according to their purposes and display data using circle graphs.**

**Understanding Graphing / Topic 2 / Collecting Data; Presenting Data: Circle or Pie Graphs: Examples 1, 2**