| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| I Number Sense and Operations | 1. Knows word names and standard numerals for integers, fractions, decimals, ratios, numbers expressed as percents, numbers with exponents, numbers expressed in scientific notation, and numbers expressed using the square root radical. **(MA.A.1.3.1)**<br>2. Reads and writes whole numbers and decimals in expanded form, including exponential notation. **(MA.A.1.3.1)**<br>3. Explores different subsets of real numbers (e.g., rational and irrational numbers), and use oral and written language to describe similarities and differences. **(MA.A.1.3.1)**<br>4. Uses technology (e.g., calculators, computers) and manipulative to discover number patterns. **(MA.A.1.3.1)**<br>5. Compares and orders integers, fractions, decimals, numbers with exponents, and numbers expressed as percents of in scientific notation, including ordering on a number line. **(MA.A.1.3.2)**<br>6. Knows examples of rational and irrational numbers in real-world situations, including the irrational numbers. **(MA.A.1.3.3)**<br>7. Describes the meanings of rational and irrational numbers using physical or graphical displays. **(MA.A.1.3.3)**<br>8. Constructs models to represent rational numbers. **(MA.A.1.3.3)**<br>9. Knows the relationships among fractions, decimals, and percents. **(MA.A.1.3.4)** | A. The student understands the different ways numbers are represented and used in the real world. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 10. Expresses a given quantity in a variety of ways (for example, integers, fractions, decimals, numbers expressed as a percent, numbers expressed in scientific notation, ratios). **(MA.A.1.3.4)**<br><br>11. Knows whether numbers expressed in different forms are equal. **(MA.A.1.3.4)**<br><br>12. Converts a number expressed in one form to its equivalent in another form. **(MA.A.1.3.4)**<br><br>13. Uses square and square roots to solve real world problems. **(MA.A.1.3.4)** | |
| | 14. Expresses whole numbers in exponential notation (for example, $36 = 6^2$). **(MA.A.2.3.1)**<br><br>15. Evaluates numerical expressions that contain exponential notation. **(MA.A.2.3.1)**<br><br>16. Expresses numbers in scientific notation as numbers in standard form. **(MA.A.2.3.1)**<br><br>17. Applies knowledge of the decimal number system and of non-place-value systems. **(MA.A.2.3.1)** | B. The student understands number systems. |
| | 18. Knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals. **(MA.A.3.3.1)**<br><br>19. Uses models or pictures to show the effects of addition, subtraction, multiplication, and division on whole numbers, decimals, fractions, mixed numbers, and integers. **(MA.A.3.3.1)** | C. The student understands the effects of operations on numbers and the relationships among these operations, selects appropriate operations, and computes for problem solving. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 20. Applies the properties of rational numbers to solve problems (commutative, associative, distributive, identity, equality, inverse). **(MA.A.3.3.1)**<br><br>21. Knows the inverse relationship of positive and negative numbers. **(MA.A.3.3.1)**<br><br>22. Uses technology (e.g., calculators, computers) and manipulative as tools to perform operations with real numbers. **(MA.A.3.3.1)**<br><br>23. Knows the appropriate operation to solve real-world problems involving fractions, decimals, and integers. **(MA.A.3.3.2)**<br><br>24. Solves real-world problems involving decimals and fractions using two- or three- step problems. **(MA.A.3.3.2)**<br><br>25. Solves real-world problems involving percents (for example, discounts, simple interest, taxes, tips). **(MA.A.3.3.2)**<br><br>26. Applies order of operations to solve problems (parentheses, exponents, multiplication, division, addition, and subtraction). **(MA.A.3.3.2)**<br><br>27. Knows proportional relationships and uses tables, graphs, or "constant ratio" relationships to solve and explain problems. **(MA.A.3.3.2)**<br><br>28. Uses proportional reasoning as a problem solving strategy. **(MA.A.3.3.2)**<br><br>29. Develop, analyze and explain methods for solving proportions. **(MA.A.3.3.2)** | |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 30. Solves one- or two-step real-world problems involving whole numbers, fractions or decimals using appropriate methods of computation, such as mental computation, paper and pencil, and calculator. **(MA.A.3.3.3)** | |
| | 31. Knows an appropriate estimation technique for a given situation using whole numbers and fractions. **(MA.A.4.3.1)** | D. The student uses estimation in problem and computation. |
| | 32. Estimates to predict results and check reasonableness of results. **(MA.A.4.3.1)** | |
| | 33. Determines whether an exact answer is needed or an estimate would be sufficient. **(MA.A.4.3.1)** | |
| | 34. Knows if numbers are prime or composite. **(MA.A.5.3.1)** | E. The student understands and applies theories related to numbers. |
| | 35. Finds the greatest common factor and least common multiple of two or more numbers. **(MA.A.5.3.1)** | |
| | 36. Determines the prime factorization of a composite number. **(MA.A.5.3.1)** | |
| | 37. Applies number theory concepts to determine the terms in a sequence. **(MA.A.5.3.1)** | |
| | 38. Applies number theory concepts, including divisibility rules, to solve real-world or mathematical problems. **(MA.A.5.3.1)** | |
| | 39. Applies special number relationships such as sequence and series to real world problems. **(MA.A.5.3.1)** | |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 40. Uses concepts about numbers including primes, factors and multiples to build number sequences. **(MA.A.5.3.1)** | |
| II Measurement | 1. Uses concrete or graphic models to create formulas for finding volumes of solids (prisms and cylinders). **(MA.B.1.3.1)**<br>2. Uses concrete or graphic models to create formulas for finding surface area of prisms and cylinders. **(MA.B.1.3.1)**<br>3. Solves and explains problems involving perimeter, area and circumference. **(MA.B.1.3.1)**<br>4. Solves and explains problems involving the surface area or volume of prisms and cylinders. **(MA.B.1.3.1)**<br>5. Finds the measure of an angle by measuring with a protractor or applying angle relationships (for example, corresponding, complementary, supplementary, interior, exterior). **(MA.B.1.3.2)**<br>6. Develops and uses the distance formula in solving real-world problems (d = rt). **(MA.B.1.3.2)**<br>7. Solve real world problems involving rated measures (miles per hour, feet per second, etc.) **(MA.B.2.3.2)**<br>8. Given a two- or three-dimensional figure, creates a new figure by increasing or decreasing the original dimensions. **(MA.B.1.3.3)** | A. The student measures quantities in the real world and uses the measures to solve problems. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 9. Knows the relationships between the perimeters, areas, surface areas, or volumes of the original figure and those of the newly created figure. **(MA.B.1.3.3)** | |
| | 10. Knows an appropriate scale needed to produce a proportional drawing or model. **(MA.B.1.3.4)** | B. The student compares, contrasts, and converts within systems of measurement (both standard/nonstandard and metric/ customary). |
| | 11. Knows proportional relationships used in scale drawings. **(MA.B.1.3.4)** | |
| | 12. Produces a scale drawing. **(MA.B.1.3.4)** | |
| | 13. Measures length, weight or mass, and capacity or volume using customary or metric units. **(MA.B.2.3.1)** | |
| | 14. Knows relationships between metric units of mass and capacity (for example, one cubic centimeter of water weighs one gram). **(MA.B.2.3.1)** | |
| | 15. Finds measures of length, weight or mass, and capacity or volume using proportional relationships and properties of similar geometric figures (for example, using shadow measurement and properties of similar triangles to find the height of a flagpole). **(MA.B.2.3.1)** | |
| | 16. Compares units of measurement within a system (metric or customary). **(MA.B.2.3.2)** | |
| | 17. Performs operations on measurements within either the metric or customary system (for example, finds three times 27 inches and expresses the answer in yards). **(MA.B.2.3.2)** | |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 18. Selects the appropriate unit of measurement when solving real-world problems (for example linear, square and cubic units). **(MA.B.2.3.2)**<br><br>19. Solves problems using the metric or customary system involving conversions within the same system. **(MA.B.2.3.2)** | |
| | 20. Knows whether an exact answer is needed or if an estimate is sufficient. **(MA.B.3.3.1)**<br><br>21. Estimates solutions to real-world problems by estimating the length, volume or capacity, weight or mass, perimeter, or area of objects or shapes in either customary or metric units. **(MA.B.3.3.1)**<br><br>22. Estimates solutions to real-world problems involving measurement, including estimates of time, temperature, and money. **(MA.B.3.3.1)** | C. The student estimates measurements in real-world problem situations. |
| | 23. Selects appropriate units of measurement in a real-world context. **(MA.B.4.3.1)**<br><br>24. Knows that measurements are always approximate and that the degree of accuracy of a measurement depends upon the precision of the instrument. **(MA.B.4.3.1)**<br><br>25. Knows the precision of different measuring instruments. **(MA.B.4.3.1)**<br><br>26. Determines the appropriate precision unit for a given situation. **(MA.B.4.3.1)** | D. The student selects and uses appropriate units and instruments for measurement to achieve the degree of precision and accuracy required in real-world situations. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 27. Selects a measurement tool (for example, scales, rulers, thermometers, measuring cups, protractors, and gauges) appropriate to a given situation. **(MA.B.4.3.2)**<br><br>28. Measures accurately with measurement tools to the specified degree of accuracy for the task and in keeping with the precision of the measurement tool. **(MA.B.4.3.2)** | |
| III Geometry and Spatial Sense | 1. Identifies draws, and uses symbolic notation to denote the basic properties of geometric terms including lines (intersecting, skew, parallel, perpendicular) and congruent figures. **(MA.C.1.3.1)**<br><br>2. Determines the measure of various types of angles using protractor or angle relationships (including complementary, supplementary, and vertical angles). **(MA.C.1.3.1)**<br><br>3. Compares and describes the attributes of regular and irregular polygons (for example, parallelogram, trapezoid, pentagon, hexagon). **(MA.C.1.3.1)**<br><br>4. Identifies and classifies triangles and quadrilaterals. **(MA.C.1.3.1)**<br><br>5. Knows the attributes of and draws three-dimensional figures (pyramid, cone, sphere, hemisphere) and can predict attributes of unseen faces. **(MA.C.1.3.1)**<br><br>6. Knows the properties of two- and three-dimensional figures. **(MA.C.1.3.1)**<br><br>7. Constructs and represents geometric figures. **(MA.C.1.3.1)** | A. The student describes, draws, identifies, and analyzes two- and three-dimensional shapes. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 8. Constructs and describes the construction of plane figures using the appropriate tools. **(MA.C.1.3.1)** | |
| | 9. Uses manipulative and drawings to solve problems requiring spatial visualization. **(MA.C.2.3.1)** | B. The student visualizes and illustrates ways in which shapes can be combined, subdivided, and changed. |
| | 10. Describes and applies the properties of parallelism, perpendicularity and symmetry in real-world contexts. **(MA.C.2.3.1)** | |
| | 11. Recognizes, draws, and describes congruent and similar figures using appropriate terminology. **(MA.C.2.3.1)** | |
| | 12. Creates and describes the attributes of a figure either congruent or similar to a given figure. **(MA.C.2.3.1)** | |
| | 13. Identifies and performs the various transformations (reflection, translation, rotation) of a given figure on a coordinate plane. **(MA.C.2.3.1)** | |
| | 14. Predicts, describes and verifies patterns involving tessellations. **(MA.C.2.3.2)** | |
| | 15. Observes, explains, and makes conjectures regarding geometric properties and relationships (among angles, lines, regular and irregular polygons). **(MA.C.3.3.1)** | C. The student uses coordinate geometry to locate objects in both two and three dimensions and to describe objects algebraically. |
| | 16. Given a variety of regular polygons (triangle, square, pentagon, hexagon, etc.) investigates the relationship between the number of sides and the number of diagonals of any regular polygon. **(MA.C.3.3.1)** | |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 17. Creates and solves angle measurement problems for triangles. **(MA.C.3.3.1)**<br><br>18. Demonstrates the Pythagorean relationship in right triangles using models or diagrams (for example, manipulative, dot graph, or isometric paper). **(MA.C.3.3.1)**<br><br>19. Given two sides of a right triangle, uses the Pythagorean Theorem to find the length of the third side. **(MA.C.3.3.1)**<br><br>20. Identifies each quadrant and the characteristics of points in each quadrant (positive and negative). **(MA.C.3.3.2)**<br><br>21. Identifies and plots ordered pairs in all four quadrants of the coordinate system. **(MA.C.3.3.2)**<br><br>22. Using the coordinate system, applies and algebraically verifies properties of two-dimensional figures including vertical and horizontal distance, midpoint and slope. **(MA.C.3.3.2)** | |
| IV Algebraic Thinking | 1. Uses manipulative and graphic materials to generate tables and charts (for example, input, output) to develop algebraic expressions, equations, or formulas **(MA.D.1.3.1)**<br><br>2. Given instances of a pattern, expresses a generalization of the pattern using algebraic expressions. **(MA.D.1.3.1)**<br><br>3. Given an algebraic expression of a relationship or pattern, supplies specific instances of the relationship or pattern. **(MA.D.1.3.1)** | A. The student describes, analyzes, and generalizes a wide variety of patterns, relations, and functions. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 4. Predicts outcomes based on a generalization of a pattern or relationship. **(MA.D.1.3.1)**<br><br>5. Identities and classifies polynomials (up to the third degree) using manipulative, diagrams and symbols. **(MA.D.1.3.1)**<br><br>6. Interprets and creates tables, function tables, and graphs (all four quadrants). **(MA.D.1.3.2)**<br><br>7. Writes expressions and equations to describe relationships. **(MA.D.1.3.2)**<br><br>8. Graphs equations to explain cause-and-effect relationships. **(MA.D.1.3.2)**<br><br>9. Uses order of operations to simplify variable expressions. **(MA.D.2.3.1)**<br><br>10. Uses inequalities to describe regions restricted by vertical and horizontal lines. **(MA.D.2.3.1)**<br><br>11. Translates verbal expressions and sentences into algebraic expressions and equations. **(MA.D.2.3.1)**<br><br>12. Translates algebraic expressions, equations, or formulas representing real-world relationships into verbal expressions or sentences. **(MA.D.2.3.1)**<br><br>13. Given an algebraic equation or expression of a real-world application, substitutes integral values for variables and simplifies the results. **(MA.D.2.3.1)** | B. The student uses expressions, equations, inequalities, graphs, and formulas to represent and interpret situations. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 14. Uses pictures, models, manipulative or other strategies (technology) to solve one-step and simple multi-step linear equations. **(MA.D.2.3.1)**<br><br>15. Graphs solutions to equations and inequalities on a number line. **(MA.D.2.3.1)**<br><br>16. Graphs linear equations on the coordinate plane from a table of values. **(MA.D.2.3.1)**<br><br>17. Generates and graphs simple equations and inequalities in two variables using graphing calculators. **(MA.D.2.3.1)**<br><br>18. Represents a physical situation using variables. **(MA.D.2.3.1)**<br><br>19. Represents and solves real world problems graphically, with algebraic expressions, equations, and inequalities. **(MA.D.2.3.1)**<br><br>20. Represents real world problem situations using finite graphs, matrices, sequences, series, and recursive relationships. **(MA.D.2.3.1)**<br><br>21. Uses systems of equations and inequalities to solve real world problems graphically, algebraically and with matrices. **(MA.D.2.3.1)**<br><br>22. Knows how to solve linear equations and inequalities representing real-world situations, using pictures, models, manipulatives (such as algebra tiles), or other strategies. **(MA.D.2.3.2)**<br><br>23. Simplifies algebraic expressions with one variable. **(MA.D.2.3.2)** | |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| V Data Analysis and Probability | 1. Generates and collects data for analysis. **(MA.E.1.3.1)**<br>2. Interprets and analyzes data presented in a variety of forms, including box-and-whisker graphs and scatter plots to identify weak, strong, positive, negative and no correlation by interpreting the slope of a data line. **(MA.E.1.3.1)**<br>3. Constructs, interprets, and explains displays of data, such as tables and graphs (circle graphs, different displays of data lead to different interpretations. **(MA.E.1.3.1)**<br>4. Finds the range, mean, median, and mode of data from a table, chart, or graph. **(MA.E.1.3.2)**<br>5. Draws conclusions from an analysis of range and central tendency of a set of real-world data. **(MA.E.1.3.2)**<br>6. Applies and analyzes appropriate measures of central tendency (mode, mean, median, range) for a set of data. **(MA.E.1.3.3)**<br>7. Uses technology, such as graphing calculators and computer spreadsheets, to analyze data and create graphs. **(MA.E.1.3.3)** | A. The student understands and uses the tools of data analysis for managing information. |
| | 8. Obtains experimental results using manipulatives. **(MA.E.2.3.1)**<br>9. Establishes the theoretical probability of an event, designs an experiment to verify it, and compare the results for validity (e.g., probability of HT coin toss is .5). **(MA.E.2.3.1)** | B. The student identifies patterns and makes predictions from an orderly display of data using concepts of probability and statistics. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 10. Explains observed difference between mathematical (theoretical) and experimental results. **(MA.E.2.3.1)**<br><br>11. Calculates simple and compound mathematical probabilities for independent and dependent events. **(MA.E.2.3.1)**<br><br>12. Computes the mathematical odds for and against a specified outcome in given real-world experiments. **(MA.E.2.3.2)**<br><br>13. Formulates hypotheses, designs experiments, collects and interprets data, and evaluates hypotheses by making inferences and drawing conclusions based on statistics (range, median, mean, and mode), tables, graphs, and charts. **(MA.E.3.3.1)**<br><br>14. States a simple hypothesis, design an appropriate instrument to test it (e.g., a questionnaire), and use data collection techniques to gather information related to the problem; analyze and interpret data; draw conclusions, and write a technical report. (Actual project to be conducted by students in a cooperative-learning mode). **(MA.E.3.3.1)(MA.E.3.3.2)**<br><br>15. Determines which measure of central tendency is more appropriate to describe a given problem. **(MA.E.3.3.1)(MA.E.3.3.2)**<br><br>16. Recognizes misleading representations of statistical data and bias in statistical research. **(MA.E.3.3.1)(MA.E.3.3.2)**<br><br>17. Explains the limitations of using statistical techniques and data in making inferences and valid arguments. **(MA.E.3.3.2)** | C. The student statistical methods to make inferences and valid arguments about real-world situations. |

| COMPONENT | OBJECTIVES | COMPETENCY |
|---|---|---|
| | 18. Identifies the common uses and misuses of probability and statistical analysis in the everyday world. **(MA.E.3.3.2)** | |