

**JEFFERSON COUNTY SCHOOLS**  
**8th Grade Mathematics**

| Instruction Period | Dates Taught | CONTENT STANDARD/ GLE   | Checks for Understanding   | Student Performance Indicators (SPI)  | Building blocks for the new standards  |
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|                    |              |   |  |   |  |
| All Year           |              | GLE 0806.1.1 Use mathematical language, symbols, and definitions while developing mathematical reasoning.<br>GLE 0806.1.2 Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution. | √ 0806.1.6 Use models (such as dynamic geometry software, patty paper and geo boards) to explore relationships among angles (complementary, supplementary, interior, exterior, vertical, and corresponding). | SPI 0806.1.1 Solve problems involving rate/time/distance (i.e., $d = rt$ ). SPI<br>0806.1.3 Calculates rates involving cost per unit to determine the best buy. | SPI 0706.1.1 Use proportional reasoning to solve mixture/concentration problems.<br>SPI 0706.1.4 Use scales to read maps.<br>SPI 0706.2.6 Express the ratio between two quantities as a percent, and a percent as a ratio or fraction.<br>SPI 0706.2.7 Use ratios and proportions to solve problems.<br>√ 0706.2.7 Write number sentences to solve contextual problems involving ratio and percent.<br>√ 0706.2.8 Apply ratios, rates, proportions and percents (such as discounts, interest, taxes, tips, distance/rate/time, and percent increase or decrease).<br>SPI 0706.2.5 Solve contextual problems that involve operations with integers.<br>√ 0706.2.4 Understand that $a$ and $-a$ are additive inverses and are located the same distance from zero on the number line; relate distance from zero to absolute value.<br>√ 0706.2.5 Understand that $-(-a) = a$ for any number $a$ .<br>√ 0706.2.6 Use the number line to demonstrate addition and subtraction with integers. |
| All Year           |              | GLE 0806.1.3 Develop independent reasoning to communicate mathematical ideas and derive algorithms and/or formulas.   |  |   |  |
| All Year           |              | GLE 0806.1.4 Move flexibly between concrete and abstract representations of mathematical ideas in order to solve problems, model mathematical ideas, and communicate solution strategies.   | √ 0806.1.8 Use a variety of methods to solve real-world problems involving multi-step linear equations (e.g., manipulatives, technology, pencil and paper).  |   |  |

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| All Year    | GLE 0806.1.5 Use mathematical ideas and processes in different settings to formulate patterns, analyze graphs, set up and solve problems and interpret solutions. | √ 0806.1.4 Relate data concepts to relevant concepts in the earth and space, life, and physical sciences.   | SPI 0806.1.2 Interpret a qualitative graph representing a contextual situation.  |   |
| All Year    | GLE 0806.1.6 Read and interpret the language of mathematics and use written/oral communication to express mathematical ideas precisely.                           | √ 0806.1.5 Use age-appropriate books, stories, and videos to convey ideas of mathematics.   |  |   |
| 1st 9 Weeks | GLE 0806.3.1 Recognize and generate equivalent forms for algebraic expressions.   | √ 0806.3.1 Perform basic operations on algebraic expressions (including grouping, order of operations, exponents, square/cube roots, simplifying and expanding).  |  | SPI 0706.3.1 Evaluate algebraic expressions involving rational values for coefficients and/or variables.<br>√ 0706.3.1 Perform basic operations on linear expressions (including grouping, order of operations, exponents, simplifying and expanding).  |
| 1st 9 Weeks | GLE 0806.2.1 Extend understanding of the real number system to include irrational numbers.  | √ 0806.2.2 Square numbers and simplify square roots. √<br>0806.2.4 Use a Venn diagram to represent the subsets of the real number system. √<br>0806.2.5 Identify the subset(s) of the real number system to which a number belongs. | SPI 0806.2.1 Order and compare rational and irrational numbers and locate on the number line. SPI<br>0806.2.2 Identify numbers and square roots as rational or irrational. | SPI 0706.2.1 Simplify numerical expressions involving rational numbers.<br>√ 0706.2.1 Understand that the set of rational numbers includes any number that can be written as a ratio of two integers in which the denominator is not zero.<br>√ 0706.2.2 Develop and analyze algorithms and compute efficiently with integers and rational numbers.<br>√ 0706.2.3 Recognize that rational numbers satisfy the commutative and associative laws of addition and multiplication and the distributive law.<br>SPI 0706.2.2 Compare rational numbers using appropriate inequality symbols.<br>√ 0706.2.9 Efficiently compare and order rational numbers [and roots of perfect squares/cubes]; determine their approximate locations on a number line.<br>√ 0706.2.14 Express numbers in scientific notation and recognize its importance in representing the magnitude of a number. |
| 1st 9 Weeks | GLE 0806.2.4 Understand and use the laws of exponents.  | √ 0806.2.6 Simplify expressions using the laws of exponents.  |  | √ 0706.2.13 Use the meaning of negative exponents to represent small numbers; translate between scientific and standard notation.   |

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| 1st 9 Weeks | GLE 0806.2.2 Solve problems involving exponents and scientific notation using technology appropriately.                   | <p>√ 0806.2.1 Recognize and use exponential, scientific, and calculator notation.</p> <p>√ 0806.2.7 Add, subtract, multiply, and divide numbers expressed scientific notation.</p>   | <p>SPI 0806.2.3 Use scientific notation to compute products and quotients.</p> <p>SPI 0806.2.4 Solve real-world problems requiring scientific notation.</p>                              | <p>SPI 0706.2.3 Use rational numbers and roots of perfect squares/cubes to solve contextual problems. SPI</p> <p>√ 0706.2.4 Determine the approximate location of square/cube roots on a number line.</p> <p>√ 0706.2.9 Efficiently compare and order [rational numbers and] roots of perfect squares/cubes; determine their approximate locations on a number line.</p> <p>√ 0706.2.10 Recognize that when a whole number is not a perfect square, then its square root is not rational and cannot be written as the ratio of two integers.</p> <p>√ 0706.2.11 Estimate square/cube roots and use calculators to find approximations.</p> <p>√ 0706.2.12 Recognize <math>mn = m \cdot n</math> and <math>(m)^2 = m</math>.</p> |
| 1st 9 Weeks | GLE 0806.2.3 Solve real-world problems using rational and irrational numbers.   | √ 0806.2.3 Solve contextual problems involving powers and roots.   |  |   |
| 2nd 9 Weeks | GLE 0806.3.2 Represent, analyze, and solve problems involving linear equations and inequalities in one and two variables. | <p>√ 0806.3.2 Represent algebraic relationships with equations and inequalities.</p> <p>√ 0806.3.4 Understand the relationship between the graph of a linear inequality and its solutions.</p> <p>√ 0806.3.5 Solve linear inequalities in two variables (including those whose solutions require multiplication or division by a negative number).</p> <p>√ 0806.3.13 Represent situations and solve real-world problems using symbolic algebra.</p> | <p>SPI 0806.3.2 Solve the linear equation <math>f(x) = g(x)</math>.</p> <p>SPI 0806.3.3 Solve and graph linear inequalities in two variables.</p>  | <p>SPI 0706.1.2 Generalize a variety of patterns to a symbolic rule from tables, graphs, or words.</p> <p>SPI 0706.3.7 Translate between verbal and symbolic representations of real-world phenomena involving linear equations</p> <p>√ 0706.3.2 Represent and analyze mathematical situations using algebraic symbols. SPI 0706.3.9 Solve linear inequalities in one variable with rational coefficients symbolically or graphically.</p> <p>√ 0706.3.14 Understand that when solving linear inequalities, multiplication or division by a negative reverses the inequality symbol.</p>   |
| 2nd 9 Weeks | GLE 0806.3.3 Solve systems of linear equations in two variables.  | √ 0806.3.3 Solve systems of linear equations in two variables and relate the systems to pairs of lines that intersect, are parallel, or are the same line.   | SPI 0806.3.1 Find solutions to systems of two linear equations in two variables.   |   |
| 2nd 9 Weeks | GLE 0806.3.4 Translate among verbal, tabular, graphical and algebraic representations of linear functions.                | <p>√ 0806.3.6 Identify x- and y-intercepts and slope of linear equations from an equation, graph or table.</p> <p>√ 0806.3.9 Given a function rule, create tables of values for x and y, and plot graphs of nonlinear functions.</p>   | <p>SPI 0806.3.4 Translate between various representations of a linear function.</p> <p>SPI 0806.3.6 Analyze the graph of a linear function to find solutions, roots, and intercepts.</p> | <p>SPI 0706.3.5 Represent proportional relationships with equations, tables and graphs.</p> <p>√ 0706.3.10 Solve problems involving unit rates (e.g., miles per hour, words per minute). SPI 0706.3.6 Solve linear equations with rational coefficients symbolically or graphically.</p> <p>SPI 0706.3.8 Solve contextual problems involving two-step linear equations.</p> <p>√ 0706.3.6 Understand that the graph of a linear function f is the set of points on a line representing the ordered pairs (x, f(x)).</p>   |

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| 2nd 9 Weeks | GLE 0806.1.8 Use technologies/manipulatives appropriately to develop understanding of mathematical algorithms, to facilitate problem solving, and to create accurate and reliable models of mathematical concepts. | √ 0806.1.2 Draw qualitative graphs (trend graphs) of functions and describe their general shape/trend.<br>√ 0806.1.7 Use a graphing calculator or spreadsheet to create scatterplots of data and approximate lines of best fit.  |  |   |
| 2nd 9 Weeks | GLE 0806.3.5 Use slope to analyze situations and solve problems.   | √ 0806.3.7 Analyze situations and solve problems involving constant rate of change.<br>√ 0806.3.8 Recognize a proportion as a special case of a linear equation and understand that the constant of proportionality is the slope, and the resulting graph is a line through the origin.  | SPI 0806.3.5 Determine the slope of a line from an equation, two given points, a table or a graph. |   |
| 3rd 9 Weeks | GLE 0806.3.6 Compare and contrast linear and nonlinear functions.  | √ 0806.1.1 Relate nonlinear functions to geometric contexts of length, area, and volume.<br>√ 0806.3.10 Distinguish quadratic and exponential functions as nonlinear using a graph and/or a table of values.<br>√ 0806.3.11 Distinguish between the equations of linear, quadratic, and exponential functions (e.g. function families such as $y=x^2$ , $y=2^x$ , and $y=2x$ ).<br>√ 0806.3.12 Understand how rates of change of nonlinear functions contrast with constant rates of change of linear functions. | SPI 0806.3.7 Identify, compare and contrast functions as linear or nonlinear.                      | SPI 0706.3.2 Determine whether a relation (represented in various ways) is a function.<br>SPI 0706.1.3 Recognize whether information given in a table, graph, or formula suggests a directly proportional, linear, inversely proportional, or other nonlinear relationship.<br>□ 0706.3.3 Identify a function from a written description, table, graph, rule, set of ordered pairs, and/or mapping.<br>□ 0706.3.7 Distinguish proportional relationships ( $y/x = k$ , or $y = kx$ ) from other relationships, including inverse proportionality ( $xy = k$ , or $y = k/x$ ).<br>SPI 0706.3.3 Given a table of inputs $x$ and outputs $f(x)$ , identify the function rule and continue the pattern. |

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|             |   |  |   | <p>SPI 0706.3.4 Interpret the slope of a line as a unit rate given the graph of a proportional relationship.</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> 0706.3.4 Make tables of inputs <math>x</math> and outputs <math>f(x)</math> for a variety of rules that include rational numbers (including negative numbers) as inputs</li> <li><input type="checkbox"/> 0706.3.5 Plot points to represent tables of linear function values.</li> <li><input type="checkbox"/> 0706.3.8 Understand slope as the ratio of vertical change to horizontal change.</li> <li><input type="checkbox"/> 0706.3.9 Identify a function exhibiting a constant rate of change as a linear function and identify the slope as a unit rate.</li> <li><input type="checkbox"/> 0706.3.11 Relate the features of a linear equation to a table and/or graph of the equation.</li> <li><input type="checkbox"/> 0706.3.12 Use linear equations to solve problems and interpret the meaning of slope, <math>m</math>, and the <math>y</math>-intercept, <math>b</math>, in <math>f(x) = mx + b</math> in terms of the context.</li> <li><input type="checkbox"/> 0706.3.13 Given a graph that exhibits the intersection of a line and the <math>y</math>-axis, write a linear function in slope-intercept form: <math>y = mx + b</math>.</li> </ul> |
| 3rd 9 Weeks | <p>GLE 0806.1.7 Recognize the historical development of mathematics, mathematics in context, and the connections between mathematics and the real world. GLE 0806.4.1 Derive the Pythagorean theorem and understand its applications.</p> | <p>√ 0806.1.3 Research the contributions of Pythagoras to mathematics. √<br/>       0806.4.1 Model the Pythagorean Theorem.<br/>       √ 0806.4.2 Use the converse of the Pythagorean Theorem to determine if a triangle is a right triangle.</p>                            | <p>SPI 0806.4.1 Use the Pythagorean theorem to solve contextual problems.<br/>       SPI 0806.4.2 Apply the Pythagorean theorem to find distances between points in the coordinate plane to measure lengths and analyze polygons and polyhedra.</p> |   |
| 3rd 9 Weeks | <p>GLE 0806.4.2 Understand the relationships among the angles formed by parallel lines cut by transversals.</p>   | <p>√ 0806.4.5 Analyze the congruent and supplementary relationships of angles formed by parallel lines and transversals (such as alternate interior, alternate exterior, corresponding, and adjacent).</p>   | <p>SPI 0806.4.3 Find measures of the angles formed by parallel lines cut by a transversal.</p>  |   |
| 3rd 9 Weeks | <p>GLE 0806.4.5 Use visualization to describe or identify intersections, cross-sections, and various views of geometric figures.</p>  | <p>√ 0806.4.7 Visualize or describe the cross-section resulting from the intersection of a plane with a 3-dimensional figure.<br/>       √ 0806.4.8 Build, draw, and work with 2- and 3-dimensional figures by means of orthogonal views, projective views, and/or nets.</p> | <p>SPI 0806.4.5 Identify the intersection of two or more geometric figures in the plane.</p>  |   |

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| 3rd 9 Weeks | GLE 0806.4.3 Understand the necessary levels of accuracy and precision in measurement. | <p>√ 0806.4.3 Select or use the appropriate measurement instrument to determine or create a given length, area, volume, angle, weight, or mass.</p> <p>√ 0806.4.4 Understand how the precision of measurement influences accuracy of quantities derived from these measurements.</p> |   | <p>√ 0706.2.15 Report results of calculations appropriately in a given context (i.e. using rules of rounding, degree of accuracy, and/or significant digits). SPI</p> <p>0706.4.2 Use SSS, SAS, and AA to determine if two triangles are similar.</p> <p>SPI 0706.4.1 Solve contextual problems involving similar triangles.</p> <p>√ 0706.4.1 Solve problems involving indirect measurement such as finding the height of a building by comparing its shadow with the height and shadow of a known object.</p> <p>√ 0706.4.2 Use similar triangles and proportionality to find the lengths of unknown line segments in a triangle.</p> <p>√ 0706.4.5 Solve problems using ratio quantities: velocity (measured in units such as miles per hour), density (measured in units such as kilograms per liter), pressure (measured in units such as pounds per square foot), and population density (measured in units such as persons per square mile).</p> |
|             |  |  |   | <p>SPI 0706.4.3 Apply scale factor to solve problems involving area and volume.</p> <p>√ 0706.4.3 Understand that if a scale factor describes how corresponding lengths in two similar objects are related, then the square of the scale factor describes how corresponding areas are related, and the cube of the scale factor describes how corresponding volumes are related.</p> <p>√ 0706.4.4 Compare angles, side lengths, perimeters and areas of similar shapes.</p>  |
| 3rd 9 Weeks | GLE 0806.4.4 Understand both metric and customary units of measurement.                | √ 0806.4.6 Make within-system and between-system conversions of derived quantities (including distance, temperature, money.)   | SPI 0806.4.4 Convert between and within the U.S. Customary System and the metric system.  |   |
| 4th 9 Weeks | GLE 0806.5.1 Explore probabilities for compound, independent and/or dependent events.  | <p>√ 0806.5.1 Solve simple problems involving probability and relative frequency.</p> <p>√ 0806.5.2 Compare probabilities of two or more events and recognize when certain events are equally likely.</p>  | <p>SPI 0806.5.1 Calculate probabilities of events for simple experiments with equally probable outcomes.</p> <p>SPI 0806.5.2 Use a variety of methods to compute probabilities for compound events (e.g., multiplication, organized lists, tree diagrams, area models).</p> | <p>SPI 0706.5.4 Use theoretical probability to make predictions.</p> <p>√ 0706.5.4 Use proportional reasoning to make predictions about results of experiments and simulations.</p> <p>√ 0706.5.6 Use a tree diagram or organized list to determine all possible outcomes of a simple probability experiment.</p>   |

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| 4th 9 Weeks | GLE 0806.5.2 Select, create, and use appropriate graphical representations of data (including scatterplots with lines of best fit) to make and test conjectures. | √ 0806.5.4 Explain the benefits and the limitations of various representations of data (i.e., bar graphs, line graphs, circle graphs, histograms, stem-and-leaf plots, box plots, scatterplots).<br>√ 0806.5.5 Create and interpret box-and-whisker plots and scatterplots.<br>√ 0806.5.6 Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken.<br>√ 0806.5.7 Estimate lines of best fit to make and test conjectures. | SPI 0806.5.3 Generalize the relationship between two sets of data using scatterplots and lines of best fit. | SPI 0706.5.1 Interpret and employ various graphs and charts to represent data.<br>√ 0706.5.2 Interpret and solve problems using information presented in various visual forms. SPI<br>0706.5.3 Calculate and interpret the mean, median, upper-quartile, lower-quartile, and interquartile range of a set of data.<br>√ 0706.5.3 Predict and compare the characteristics of two populations based on the analysis of sample data.              |
| 4th 9 Weeks | GLE 0806.5.3 Evaluate the use of statistics in media reports.  | √ 0806.5.3 Recognize common misconceptions associated with dependent/independent events.<br>√ 0806.5.8 Consider the source, design, analysis, and display of data to evaluate statistics reported in the media.  | SPI 0806.5.4 Recognize misrepresentations of published data in the media.                                   | SPI 0706.5.2 Select suitable graph types (such as bar graphs, histograms, line graphs, circle graphs, box-and-whisker plots, and stem-and-leaf plots) and use them to create accurate representations of given data.<br>√ 0706.5.1 Create and interpret box-and-whisker plots and stem-and-leaf plots.<br>√ 0706.5.5 Apply percentages to make and interpret histograms and circle graphs.<br>√ 0706.5.5 Evaluate the design of an experiment. |
| 4th 9 Weeks | <i>TCAP REVIEW--Teacher Discretion</i>   |  |   |  |
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| Essential Vocabulary  | Common Assessment item | Materials/<br>Resources/Textbook Alignment-<br>Tennessee Pre-Algebra<br>Glencoe Mathematics<br>Copyright 2005 |
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| Algebraic Expression<br>Conjecture<br>Cost Per Unit<br>Inductive Reasoning<br>Integer<br>Order of Operation<br>Percent<br>Proportion<br>Rate<br>Ratio<br>Variable |                        | Lessons 1-1, 2-1 thru 2-5,<br>3-7, 6-1 thru 6-8,<br>*All Year   |
|   |                        | *All Year   |
|   |                        | Lesson 10-1<br>* All Year   |

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| Sequences   |  | *Refer to Glencoe<br>Workbook: "Science &<br>Mathematics Lab Manual"<br>*All Year |
|   |  | *All Year   |
| Distributive Property<br>(Algebraic)  |  | Lesson 1-2, 1-3, 1-4, 1-5, 3-<br>1, 3-2<br>*<br>Cube Roots-Enrichment 9-1         |
| Irrational Numbers<br>Perfect Square<br>Real Number<br>Square Root<br>Venn Diagram<br>Infinite (Alg. I Textbook-<br>lesson 2-1) |  | Lesson 4-4, 9-2   |
| Laws of exponents<br>Scientific Notation<br>Monomial  |  | Lessons 4-1, 4-2, 4-5, 4-6,<br>4-7, 4-8, 9-1<br>Enrichment 4-8                    |

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| Laws of Exponents  |                         | Lessons 4-7, 4-8                          |
|  | Benchmark Assessment #1 | Lessons 5-2, 5-3, 5-4, 9-2                |
| Vertical Line Test<br>Inequality<br>Intercept<br>Linear Equation |                         | Lessons 7-1 thru 7-6, 8-1, 8-2, 8-3, 8-10 |
| Multi-step Equations<br>System of Equations                      |                         | Lessons 3-3, 3-4, 3-5, 3-6, 8-9           |
| Function   |                         | Lesson 8-1, 8-2, 8-7                      |

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| Algorithm   |                         | *All Year<br>Chapter 8<br>*Refer to Glencoe<br>Workbooks: "Teaching Pre-<br>Algebra with Manipulatives"<br>& "Graphing Calculator and<br>Spreadsheet Masters" |
| Slope Intercept Form<br>Line of Best Fit (conceptual) | Benchmark Assessment #2 | Lesson 8-4, 8-5, 8-6, 8-8   |
| Nonlinear Equation                                    |                         | Lessons 8-7, 13-5, 13-6   |

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| Distance Formula<br>Hypotenuse            Legs<br>of a Triangle Pythagorean<br>Theorem  |  | Historical Connections in<br>Mathematics p.1-10 ©2005<br>AIMS Ed. Foundation<br>Lesson 9-5, 9-6, 9-7, 9-8 |
| Adjacent Angles<br>Alternate Exterior Angle<br>Alternate Interior Angle<br>Complementary Angle<br>Corresponding Angle<br>Dilations<br>Exterior Angles<br>Interior Angles<br>Supplementary Angle<br>Transversal<br>Vertical Angles |  | Lesson 10-1, 10-3   |
|   |  | Lesson 11-1<br>Enrichment 11-1, 11-2<br>*Refer to 3-D Pattern<br>Handouts                                 |

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| <p>Accuracy<br/>Area<br/>Precision<br/>Volume</p>   |                                | <p>Lessons 10-1, 10-2, 10-5,<br/>10-7, 10-8, 11-2, 11-3,<br/>p.589 with 11-7</p>                                  |
|   |                                |   |
|   | <p>Benchmark Assessment #3</p> | <p>Page 718 (Pre-Requisite Skills)<br/>Refer to Glencoe Algebra:<br/>Prerequisite Skills<br/>Workbook p.77-94</p> |
| <p>Compound Event<br/>Experimental Probability<br/>Theoretical Probability<br/>Relative Frequency</p> |                                | <p>Lessons 6-9, 12-4, 12-6, 12-8, 12-9</p>  |

