Tennessee Mathematics Standards
2009-2010 Implementation

Grade Eight Mathematics

Standard 1 – Mathematical Processes

Grade Level Expectations:

GLE 0806.1.1	Use mathematical language, symbols, and definitions while developing mathematical reasoning.
GLE 0806.1.2	Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution.
GLE 0806.1.3	Develop independent reasoning to communicate mathematical ideas and derive algorithms and/or formulas.
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.
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.
GLE 0806.1.6	Read and interpret the language of mathematics and use written/oral communication to express mathematical ideas precisely.
GLE 0806.1.7	Recognize the historical development of mathematics, mathematics in context, and the connections between mathematics and the real world.
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.

Checks for Understanding (Formative/Summative Assessment):

✓	0806.1.1	Relate nonlinear functions to geometric contexts of length, area, and volume.
✓	0806.1.2	Draw qualitative graphs (trend graphs) of functions and describe their general shape/trend.
✓	0806.1.3	Research the contributions of Pythagoras to mathematics.
✓	0806.1.4	Relate data concepts to relevant concepts in the earth and space, life, and physical sciences.
✓	0806.1.5	Use age-appropriate books, stories, and videos to convey ideas of mathematics.
✓	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).
✓	0806.1.7	Use a graphing calculator or spreadsheet to create scatterplots of data and approximate lines of best fit.
✓	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).

State Performance Indicators:

SPI 0806.1.1	Solve problems involving rate/time/distance (i.e., d = rt).
SPI 0806.1.2	Interpret a qualitative graph representing a contextual situation.
SPI 0806.1.3	Calculates rates involving cost per unit to determine the best buy.

Standard 2 – Number & Operations

Grade Level Expectations:

GLE 0806.2.1 Extend understanding of the real number system to include irrational numbers.
GLE 0806.2.2 Solve problems involving exponents and scientific notation using technology appropriately.
GLE 0806.2.3 Solve real-world problems using rational and irrational numbers.
GLE 0806.2.4 Understand and use the laws of exponents.

Checks for Understanding (Formative/Summative Assessment):

- ✓ 0806.2.1 Recognize and use exponential, scientific, and calculator notation.
- ✓ 0806.2.2 Square numbers and simplify square roots.
- ✓ 0806.2.3 Solve contextual problems involving powers and roots.
- ✓ 0806.2.4 Use a Venn diagram to represent the subsets of the real number system.
- ✓ 0806.2.5 Identify the subset(s) of the real number system to which a number belongs.
- ✓ 0806.2.6 Simplify expressions using the laws of exponents.
- ✓ 0806.2.7 Add, subtract, multiply, and divide numbers expressed scientific notation.

State Performance Indicators:

SPI 0806.2.1 Order and compare rational and irrational numbers and locate on the number line.
SPI 0806.2.2 Identify numbers and square roots as rational or irrational.
SPI 0806.2.3 Use scientific notation to compute products and quotients.
SPI 0806.2.4 Solve real-world problems requiring scientific notation.

Standard 3 – Algebra

Grade Level Expectations:

GLE 0806.3.1 Recognize and generate equivalent forms for algebraic expressions.
GLE 0806.3.2 Represent, analyze, and solve problems involving linear equations and inequalities in one and two variables.
GLE 0806.3.3 Solve systems of linear equations in two variables.
GLE 0806.3.4 Translate among verbal, tabular, graphical and algebraic representations of linear functions.
GLE 0806.3.5 Use slope to analyze situations and solve problems.
GLE 0806.3.6 Compare and contrast linear and nonlinear functions.

Checks for Understanding (Formative/Summative Assessment):

- ✓ 0806.3.1 Perform basic operations on algebraic expressions (including grouping, order of operations, exponents, square/cube roots, simplifying and expanding).
- ✓ 0806.3.2 Represent algebraic relationships with equations and inequalities.
- ✓ 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.
- ✓ 0806.3.4 Understand the relationship between the graph of a linear inequality and its solutions.
- ✓ 0806.3.5 Solve linear inequalities in two variables (including those whose solutions require multiplication or division by a negative number).
- ✓ 0806.3.6 Identify x- and y-intercepts and slope of linear equations from an equation, graph or table.
- ✓ 0806.3.7 Analyze situations and solve problems involving constant rate of change.
- ✓ 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.

- ✓ 0806.3.9 Given a function rule, create tables of values for *x* and *y*, and plot graphs of nonlinear functions.
- ✓ 0806.3.10 Distinguish quadratic and exponential functions as nonlinear using a graph and/or a table of values.
- ✓ 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).
- ✓ 0806.3.12 Understand how rates of change of nonlinear functions contrast with constant rates of change of linear functions.
- ✓ 0806.3.13 Represent situations and solve real-world problems using symbolic algebra.

State Performance Indicators:

SPI 0806.3.1 Find solutions to systems of two linear equations in two variables.
SPI 0806.3.2 Solve the linear equation $f(x) = g(x)$.
SPI 0806.3.3 Solve and graph linear inequalities in two variables.
SPI 0806.3.4 Translate between various representations of a linear function.
SPI 0806.3.5 Determine the slope of a line from an equation, two given points, a table or a graph.
SPI 0806.3.6 Analyze the graph of a linear function to find solutions and intercepts.
SPI 0806.3.7 Identify, compare and contrast functions as linear or nonlinear.

Standard 4 – Geometry & Measurement

Grade Level Expectations:

GLE 0806.4.1 Derive the Pythagorean theorem and understand its applications.
GLE 0806.4.2 Understand the relationships among the angles formed by parallel lines cut by transversals.
GLE 0806.4.3 Understand the necessary levels of accuracy and precision in measurement.
GLE 0806.4.4 Understand both metric and customary units of measurement.
GLE 0806.4.5 Use visualization to describe or identify intersections, cross-sections, and various views of geometric figures.

Checks for Understanding (Formative/Summative Assessment):

- ✓ 0806.4.1 Model the Pythagorean Theorem.
- ✓ 0806.4.2 Use the converse of the Pythagorean Theorem to determine if a triangle is a right triangle.
- ✓ 0806.4.3 Select or use the appropriate measurement instrument to determine or create a given length, area, volume, angle, weight, or mass.
- ✓ 0806.4.4 Understand how the precision of measurement influences accuracy of quantities derived from these measurements.
- ✓ 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).
- ✓ 0806.4.6 Make within-system and between-system conversions of derived quantities including distance, temperature, and money.
- ✓ 0806.4.7 Visualize or describe the cross-section resulting from the intersection of a plane with a 3-dimensional figure.
- ✓ 0806.4.8 Build, draw, and work with 2- and 3-dimensional figures by means of orthogonal views, projective views, and/or nets.

State Performance Indicators:

SPI 0806.4.1 Use the Pythagorean Theorem to solve contextual problems.

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.
SPI 0806.4.3 Find measures of the angles formed by parallel lines cut by a transversal.
SPI 0806.4.4 Convert between and within the U.S. Customary System and the metric system.
SPI 0806.4.5 Identify the intersection of two or more geometric figures in the plane.

Standard 5 – Data Analysis, Statistics, & Probability

Grade Level Expectations:

GLE 0806.5.1 Explore probabilities for compound, independent and/or dependent events.
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.
GLE 0806.5.3 Evaluate the use of statistics in media reports.

Checks for Understanding (Formative/Summative Assessment):

- ✓ 0806.5.1 Solve simple problems involving probability and relative frequency.
- ✓ 0806.5.2 Compare probabilities of two or more events and recognize when certain events are equally likely.
- ✓ 0806.5.3 Recognize common misconceptions associated with dependent and independent events.
- ✓ 0806.5.4 Explain the benefits and the limitations of various representations (i.e., bar graphs, line graphs, circle graphs, histograms, stem-and-leaf plots, box plots, scatterplots) of data.
- ✓ 0806.5.5 Create and interpret box-and-whisker plots and scatterplots.
- ✓ 0806.5.6 Use observations about differences between two or more samples to make conjectures about the populations from which the samples were taken.
- ✓ 0806.5.7 Estimate lines of best fit to make and test conjectures.
- ✓ 0806.5.8 Consider the source, design, analysis, and display of data to evaluate statistics reported in the media.

State Performance Indicators:

SPI 0806.5.1 Calculate probabilities of events for simple experiments with equally probable outcomes.
SPI 0806.5.2 Use a variety of methods to compute probabilities for compound events (e.g., multiplication, organized lists, tree diagrams, area models).
SPI 0806.5.3 Generalize the relationship between two sets of data using scatterplots and lines of best fit.
SPI 0806.5.4 Recognize misrepresentations of published data in the media.