

# Tennessee Mathematics Standards 2009-2010 Implementation

## Grade Three Mathematics

### Standard 1 – Mathematical Processes

#### Grade Level Expectations:

- GLE 0306.1.1 Use mathematical language, symbols, and definitions while developing mathematical reasoning.
- GLE 0306.1.2 Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution.
- GLE 0306.1.3 Develop independent reasoning to communicate mathematical ideas and derive algorithms and/or formulas.
- GLE 0306.1.4 Move flexibly between concrete and abstract representations of mathematical ideas in order to solve problems, model mathematical ideas, and communicate solution strategies.
- GLE 0306.1.5 Use mathematical ideas and processes in different settings to formulate patterns, analyze graphs, set up and solve problems and interpret solutions.
- GLE 0306.1.6 Read and interpret the language of mathematics and use written/oral communication to express mathematical ideas precisely.
- GLE 0306.1.7 Recognize the historical development of mathematics, mathematics in context, and the connections between mathematics and the real world.
- GLE 0306.1.8 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):

- ✓ 0306.1.1 Read and write time to the nearest minute.
- ✓ 0306.1.2 Compare and order decimal amounts in the context of money.
- ✓ 0306.1.3 Count the value of combinations of coins and bills up to five dollars.
- ✓ 0306.1.4 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, and observing patterns.
- ✓ 0306.1.5 Determine when and how to break a problem into simpler parts.
- ✓ 0306.1.6 Use estimation to check answers for reasonableness, and calculators to check for accuracy.
- ✓ 0306.1.7 Make and investigate mathematical conjectures.
- ✓ 0306.1.8 Explain and justify answers on the basis of mathematical properties, structures, and relationships.
- ✓ 0306.1.9 Use manipulatives to demonstrate that the commutative property holds for addition but not for subtraction.
- ✓ 0306.1.10 Use correct, clearly written and oral mathematical language to pose questions and communicate ideas.
- ✓ 0306.1.11 Develop strategies for solving problems involving addition and subtraction of measurements.
- ✓ 0306.1.12 Analyze and evaluate the mathematical thinking and strategies of others.
- ✓ 0306.1.13 Create and use representations to organize, record, and communicate mathematical ideas.
- ✓ 0306.1.14 Use age-appropriate books, stories, and videos to convey ideas of mathematics.

**State Performance Indicators:**

- SPI 0306.1.1 Solve problems using a calendar.
- SPI 0306.1.2 Solve problems involving elapsed time.
- SPI 0306.1.3 Determine the correct change from a transaction less than a dollar.
- SPI 0306.1.4 Match the spoken, written, concrete, and pictorial representations of fractions with denominators up to ten.
- SPI 0306.1.5 Represent problems mathematically using diagrams, numbers, and symbolic expressions.
- SPI 0306.1.6 Identify and use vocabulary to describe attributes of two- and three-dimensional shapes.
- SPI 0306.1.7 Select appropriate units and tools to solve problems involving measures.
- SPI 0306.1.8 Express answers clearly in verbal, numerical, or graphical (bar and picture) form, using units when appropriate.

## **Standard 2 - Number and Operations**

**Grade Level Expectations:**

- GLE 0306.2.1 Understand the place value of whole numbers to ten-thousands place including expanded notation for all arithmetic operations.
- GLE 0306.2.2 Develop understanding of multiplication and related division facts through multiple strategies and representations.
- GLE 0306.2.3 Relate multiplication and division as inverse operations.
- GLE 0306.2.4 Solve multiplication and division problems using various representations.
- GLE 0306.2.5 Understand the meaning and uses of fractions.
- GLE 0306.2.6 Use various strategies and models to compare and order fractions and identify equivalent fractions.
- GLE 0306.2.7 Add and subtract fractions with like denominators using various models.

**Checks for Understanding (Formative/Summative Assessment):**

- ✓ 0306.2.1 Represent whole numbers up to 10,000 using various models (such as base-ten blocks, number lines, place-value charts) and in standard form, written form, and expanded form.
- ✓ 0306.2.2 Understand and use the symbols =, < and > to signify order and comparison.
- ✓ 0306.2.3 Use parentheses to indicate grouping.
- ✓ 0306.2.4 Use a variety of methods to perform mental computations and compare the efficiency of those methods.
- ✓ 0306.2.5 Use highest order value (such as tens or hundreds digit) to make simple estimates.
- ✓ 0306.2.6 Solve a variety of addition and subtraction story problems including those with irrelevant information.
- ✓ 0306.2.7 Represent multiplication using various representations such as equal-size groups, arrays, area models, and equal jumps on number lines.
- ✓ 0306.2.8 Represent division using various representations such as successive subtraction, the number of equal jumps, partitioning, and sharing.
- ✓ 0306.2.9 Describe contexts for multiplication and division facts.
- ✓ 0306.2.10 Understand that symbols such as  $\frac{1}{2}$ ,  $\frac{1}{3}$ , and  $\frac{1}{4}$  represent numbers called unit fractions.
- ✓ 0306.2.11 Identify fractions as parts of whole units, as parts of sets, as locations on number lines, and as division of two whole numbers.
- ✓ 0306.2.12 Compare fractions using drawings, concrete objects, and benchmark fractions.
- ✓ 0306.2.13 Understand that when a whole is divided into equal parts to create unit fractions, the sum of all the parts adds up to one.

**State Performance Indicators:**

- SPI 0306.2.1 Read and write numbers up to 10,000 in numerals and up to 1,000 in words.

- SPI 0306.2.2 Identify the place value of numbers in the ten-thousands, thousands, hundreds, tens, and ones positions.
- SPI 0306.2.3 Convert between expanded and standard form with whole numbers to 10,000.
- SPI 0306.2.4 Compare and order numbers up to 10,000 using the words less than, greater than, and equal to, and the symbols  $<$ ,  $>$ ,  $=$ .
- SPI 0306.2.5 Identify various representations of multiplication and division.
- SPI 0306.2.6 Recall basic multiplication facts through 10 times 10 and the related division facts.
- SPI 0306.2.7 Compute multiplication problems that involve multiples of ten using basic number facts.
- SPI 0306.2.8 Solve problems that involve the inverse relationship between multiplication and division.
- SPI 0306.2.9 Solve contextual problems involving the addition (with and without regrouping) and subtraction (with and without regrouping) of two- and three digit whole numbers.
- SPI 0306.2.10 Identify equivalent fractions given by various representations.
- SPI 0306.2.11 Recognize and use different interpretations of fractions.
- SPI 0306.2.12 Name fractions in various contexts that are less than, equal to, or greater than one.
- SPI 0306.2.13 Recognize, compare, and order fractions (benchmark fractions, common numerators, or common denominators).
- SPI 0306.2.14 Add and subtract fractions with like denominators.

## **Standard 3 – Algebra**

### **Grade Level Expectations:**

- GLE 0306.3.1 Develop meaning for and apply the commutative, associative, and distributive properties using various representations.
- GLE 0306.3.2 Develop understanding that a letter or a symbol can represent an unknown quantity in a simple mathematical expression/equation.
- GLE 0306.3.3 Describe and analyze patterns and relationships in contexts.
- GLE 0306.3.4 Create and represent patterns using words, tables, graphs, and symbols.

### **Checks for Understanding (Formative/Summative Assessment):**

- ✓ 0306.3.1 Show that addition and multiplication are commutative operations.
- ✓ 0306.3.2 Show that subtraction and division are not commutative operations.
- ✓ 0306.3.3 Use commutative, associative, and distributive properties to multiply whole numbers.
- ✓ 0306.3.4 Solve problems using the commutative, associative, and distributive properties.
- ✓ 0306.3.5 Find unknowns in number sentences and problems involving addition, subtraction, multiplication, or division.
- ✓ 0306.3.6 Analyze patterns in words, tables, and graphs to draw conclusions.
- ✓ 0306.3.7 Create different representations of a pattern given a verbal description.
- ✓ 0306.3.8 Analyze patterns in quantitative change resulting from computation.

### **State Performance Indicators:**

- SPI 0306.3.1 Verify a conclusion using algebraic properties.
- SPI 0306.3.2 Express mathematical relationships using number sentences/equations.
- SPI 0306.3.3 Find the missing values in simple multiplication and division equations.
- SPI 0306.3.4 Describe or extend (including finding missing terms) geometric and numeric patterns.

## **Standard 4 – Geometry and Measurement**

### **Grade Level Expectations:**

- GLE 0306.4.1 Describe, compare, and analyze properties of polygons.
- GLE 0306.4.2 Understand and apply the concepts of congruence and symmetry.

- GLE 0306.4.3 Understand and use attributes of 2- and 3-dimensional figures to solve problems.
- GLE 0306.4.4 Use appropriate units, strategies and tools to solve problems involving perimeter.
- GLE 0306.4.5 Solve measurement problems involving fractional parts of linear units and capacity units.

**Checks for Understanding (Formative/Summative Assessment):**

- ✓ 0306.4.1 Describe properties of plane figures (such as circles, triangles, squares and rectangles) and solid shapes (such as spheres, cubes and cylinders).
- ✓ 0306.4.2 Classify polygons according to the number of their sides and angles.
- ✓ 0306.4.3 Classify lines and segments as parallel, perpendicular, or intersecting.
- ✓ 0306.4.4 Identify, create, and describe figures with line symmetry.
- ✓ 0306.4.5 Understand that all measurements require units.
- ✓ 0306.4.6 Recognize the use of fractions in liquid measures.
- ✓ 0306.4.7 Recognize the relationships among cups, pints, quarts, and gallons.
- ✓ 0306.4.8 Estimate and/or measure the capacity of a container.
- ✓ 0306.4.9 Measure weight to the nearest ounce or gram.
- ✓ 0306.4.10 Use reasonable units of length (i.e. kilometer, meter, centimeter; mile, yard, foot, inch) in estimates and measures.
- ✓ 0306.4.11 Know common equivalences for length (1 meter = 100 centimeters, 1 yard = 3 feet, 1 foot = 12 inches).
- ✓ 0306.4.12 Make and record measurements that use mixed units within the same system of measurement (such as feet and inches, meters and centimeters).
- ✓ 0306.4.13 Use common abbreviations: km, m, cm, in, ft, yd, mi.

**State Performance Indicators:**

- SPI 0306.4.1 Recognize polygons and be able to identify examples based on geometric definitions.
- SPI 0306.4.2 Determine if two figures are congruent based on size and shape.
- SPI 0306.4.3 Identify the line of symmetry in a two-dimensional design or shape.
- SPI 0306.4.4 Calculate the perimeter of shapes made from polygons.
- SPI 0306.4.5 Choose reasonable units of measure, estimate common measurements using benchmarks, and use appropriate tools to make measurements.
- SPI 0306.4.6 Measure length to the nearest centimeter or half inch.
- SPI 0306.4.7 Solve problems requiring the addition and subtraction of lengths.

## **Standard 5 – Data Analysis, Statistics, and Probability**

**Grade Level Expectations:**

- GLE 0306.5.1 Organize, display, and analyze data using various representations to solve problems.

**Checks for Understanding (Formative/Summative Assessment):**

- ✓ 0306.5.1 Collect and organize data using observations, surveys, and experiments.
- ✓ 0306.5.2 Construct a frequency table, bar graph, pictograph, or line plot of collected data.
- ✓ 0306.5.3 Compare and interpret different representations of the same data.
- ✓ 0306.5.4 Solve problems using data from frequency tables, bar graphs, pictographs, or line plots.

**State Performance Indicators:**

- SPI 0306.5.1 Interpret a frequency table, bar graph, pictograph, or line plot.
- SPI 0306.5.2 Solve problems in which data is represented in tables or graph.
- SPI 0306.5.3 Make predictions based on various representations of data.