Tennessee Mathematics Standards
2009-2010 Implementation

Grade Four Mathematics

Standard 1 – Mathematical Processes

Grade Level Expectations:

GLE 0406.1.1   Use mathematical language, symbols, and definitions while developing mathematical reasoning.
GLE 0406.1.2   Apply and adapt a variety of appropriate strategies to problem solving, including estimation, and reasonableness of the solution.
GLE 0406.1.3   Develop independent reasoning to communicate mathematical ideas and derive algorithms and/or formulas.
GLE 0406.1.4   Move flexibly between concrete and abstract representations of mathematical ideas in order to solve problems, model mathematical ideas, and communicate solution strategies.
GLE 0406.1.5   Use mathematical ideas and processes in different settings to formulate patterns, analyze graphs, set up and solve problems and interpret solutions.
GLE 0406.1.6   Read and interpret the language of mathematics and use written/oral communication to express mathematical ideas precisely.
GLE 0406.1.7   Recognize the historical development of mathematics, mathematics in context, and the connections between mathematics and the real world.
GLE 0406.1.8   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):

✓   0406.1.1   Understand the relationship between use of answers and the accuracy of the number.
✓   0406.1.2   Identify the range of appropriate estimates, including over-estimate and under-estimate.
✓   0406.1.3   Connect operations with decimals to money and make estimates.
✓   0406.1.4   Use commutative, associative, and distributive properties of numbers including oral descriptions of mathematical reasoning.
✓   0406.1.5   Measure using ruler, meter stick, clock, thermometer, or other scaled instruments.
✓   0406.1.6   Identify geometric or physical attributes that are appropriate to measure in a given situation.
✓   0406.1.7   Translate the details of a contextual problem into diagrams and/or numerical expressions, and express answers using appropriate units.
✓   0406.1.8   Match the spoken, written, concrete (including base ten blocks), and pictorial representations of decimals.
✓   0406.1.9   Develop a story problem that illustrates a given multiplication or division number sentence.
✓   0406.1.10 Use age-appropriate books, stories, and videos to convey ideas of mathematics.

State Performance Indicators:

SPI 0406.1.1   Verify a conclusion using the commutative, associative and distributive properties.
SPI 0406.1.2   Compare decimals using concrete and pictorial representations.
SPI 0406.1.3   Determine the correct change from a transaction.

SPI 0406.1.4   Compare objects with respect to a given geometric or physical attribute and select appropriate measurement instrument.

Standard 2 - Number and Operations

Grade Level Expectations:

GLE 0406.2.1   Understand place value of numbers from hundredths to the hundred-thousands place.
GLE 0406.2.2   Develop fluency with multiplication and single-digit division.
GLE 0406.2.3   Identify prime and composite numbers.
GLE 0406.2.4   Understand and use the connections between fractions and decimals.
GLE 0406.2.5   Add and subtract fractions with like and unlike denominators.
GLE 0406.2.6   Solve problems involving whole numbers, fractions, and/or decimals using all four arithmetic operations.

Checks for Understanding (Formative/Summative Assessment):

✓   0406.2.1   Compose and decompose quantities according to place value.
✓   0406.2.2   Understand decimal notation as an extension of the base-ten number system.
✓   0406.2.3   Multiply two- and three-digit whole numbers.
✓   0406.2.4   Understand and use a reliable algorithm for multiplying multi-digit numbers and dividing numbers by a single-digit divisor accurately and efficiently.
✓   0406.2.5   Understand that division by zero is undefined.
✓   0406.2.6   Divide three-digit whole numbers by one-digit divisors fluently with pencil and paper.
✓   0406.2.7   Identify factors of whole numbers and model factors and products beyond basic multiplication facts using arrays and area models.
✓   0406.2.8   Generate equivalent forms of whole numbers, decimals, and common fractions (e.g., 1/10, ¼, ½, ¾).
✓   0406.2.9   Compare equivalent forms whole numbers, fractions, and decimals to each other and to benchmark numbers
✓   0406.2.10   Use models to understand division as the inverse of multiplication, partitioning, and repeated subtraction.
✓   0406.2.11   Use models, benchmarks, and equivalent forms to compare fractions/decimals and locate them on the number line.
✓   0406.2.12   Understand and use decimal numbers up to hundredths and write them as fractions.
✓   0406.2.13   Solve multi-step problems of various types using whole numbers, fractions, and decimals.
✓   0406.2.14   Understand the role of the remainder in division.

State Performance Indicators:

SPI 0406.2.1   Read and write numbers from hundredths to hundred-thousands in numerals and in words.
SPI 0406.2.2   Locate and place mixed numbers on the number line.
SPI 0406.2.3   Identify the place value of a specified digit in a number and the quantity it represents.
SPI 0406.2.4   Find factors, common factors, multiples, and common multiples of two numbers.
SPI 0406.2.5   Generate equivalent forms of common fractions and decimals and use them to compare size.
SPI 0406.2.6   Use the symbols $<$, $>$ and $=$ to compare common fractions and decimals in both increasing and decreasing order.
SPI 0406.2.7   Convert improper fractions into mixed numbers and/or decimals.
SPI 0406.2.8   Add and subtract proper fractions with like and unlike denominators and simplify the answer.
SPI 0406.2.9   Add and subtract decimals through hundredths.
SPI 0406.2.10   Solve contextual problems using whole numbers, fractions, and decimals.
SPI 0406.2.11   Solve problems using whole number multi-digit multiplication.

SPI 0406.2.12   Solve problems using whole number division with one- or two-digit divisors.

Standard 3 – Algebra

Grade Level Expectations:

GLE 0406.3.1   Extend understanding of a variable to equations involving whole numbers, fractions, decimals, and/or mixed numbers.

GLE 0406.3.2   Use mathematical language and modeling to develop descriptions, rules and extensions of patterns.

GLE 0406.3.3   Translate between different forms of representations of whole number relationships.

Checks for Understanding (Formative/Summative Assessment):

✓   0406.3.1   Find an unknown quantity in simple equations using whole numbers, fractions, decimals, and mixed numbers.

✓   0406.3.2   Translate between symbols and words to represent quantities in expressions or equations.

✓   0406.3.3   Create, explain and use a rule to generate terms of a pattern or sequence.

✓   0406.3.4   Translate between symbolic, numerical, verbal, or pictorial representations of a whole number pattern or relationship.

State Performance Indicators:

SPI 0406.3.1   Use letters and symbols to represent an unknown quantity and write a simple mathematical expression.

SPI 0406.3.2   Make generalizations about geometric and numeric patterns.

SPI 0406.3.3   Represent and analyze patterns using words, function tables, and graphs.

Standard 4 – Geometry and Measurement

Grade Level Expectations:

GLE 0406.4.1   Understand and use the properties of lines, segments, angles, polygons, and circles.

GLE 0406.4.2   Understand and use measures of length, area, capacity, and weight.

GLE 0406.4.3   Solve problems that involve estimating and measuring length, area, capacity and weight.

GLE 0406.4.4   Understand the representation of location and movement within the first quadrant of a coordinate system.

Checks for Understanding (Formative/Summative Assessment):

✓   0406.4.1   Identify the basic parts of circles.

✓   0406.4.2   Understand the definition of degree as it relates to the circle.

✓   0406.4.3   Classify angles and triangles as obtuse, acute, or right.

✓   0406.4.4   Measure and draw angles.

✓   0406.4.5   Determine if a figure is a polygon.

✓   0406.4.6   Recognize the use of decimals in metric measures.

✓   0406.4.7   Measure liquids using both standard units and metric units.

✓   0406.4.8   Recognize that a measure of area represents the total number of same-sized units /that cover the shape without gaps or overlaps.

✓   0406.4.9   Recognize that area does not change when 2-dimensional figures are cut apart and rearranged.

✓   0406.4.10   Connect area measure to multiplication using a rectangular area model.

✓   0406.4.11   Estimate areas of rectangles in square inches and square centimeters.

✓   0406.4.12   Estimate the size of an object with respect to a given measurement attribute (length, perimeter, area, or capacity).

- ✓ 0406.4.13 Compare objects with respect to a given attribute such as length, area, and capacity.
- ✓ 0406.4.14 Explain how the components of a coordinate system are used to determine location.
- ✓ 0406.4.15 Explore properties of paths between points.
- ✓ 0406.4.16 Examine transformations in the coordinate plane.
- ✓ 0406.4.17 Predict the results of a transformation of a geometric shape.
- ✓ 0406.4.18 Determine whether a geometric shape has line and/or rotational symmetry.
- ✓ 0406.4.19 Design and analyze simple tilings and tessellations.
- ✓ 0406.4.20 Draw lines of symmetry in 2-dimensional figures.
- ✓ 0406.4.21 Recognize two-dimensional faces of three-dimensional shapes.

State Performance Indicators:

SPI 0406.4.1   Classify lines and line segments as parallel, perpendicular, or intersecting.

SPI 0406.4.2   Graph and interpret points with whole number or letter coordinates on grids or in the first quadrant of the coordinate plane.

SPI 0406.4.3   Construct geometric figures with vertices at points on a coordinate grid.

SPI 0406.4.4   Identify acute, obtuse, and right angles in 2-dimensional shapes.

SPI 0406.4.5   Identify attributes of simple and compound figures composed of 2- and 3- dimensional shapes.

SPI 0406.4.6   Determine situations in which a highly accurate measurement is important.

SPI 0406.4.7   Determine appropriate size of unit of measurement in problem situations involving length, capacity or weight.

SPI 0406.4.8   Convert measurements within a single system that are common in daily life (e.g., hours and minutes, inches and feet, centimeters and meters, quarts and gallons, liters and milliliters).

SPI 0406.4.9   Solve problems involving area and/or perimeter of rectangular figures.

SPI 0406.4.10   Identify images resulting from reflections, translations, or rotations.

Standard 5 – Data, Probability and Statistics

Grade Level Expectations:

GLE 0406.5.1   Collect, record, arrange, present, and interpret data using tables and various representations.

GLE 0406.5.2   Use probability to describe chance events.

Checks for Understanding (Formative/Summative Assessment):

- ✓ 0406.5.1 Create and label appropriate scales for graphs.
- ✓ 0406.5.2 Evaluate how well various representations show the collected data.
- ✓ 0406.5.3 Interpret and prepare pie charts using appropriate measurements of angles.
- ✓ 0406.5.4 Develop and use stem-and-leaf plots.
- ✓ 0406.5.5 Use measures of central tendency to compare two sets of related data.
- ✓ 0406.5.6 Determine a simple probability.
- ✓ 0406.5.7 Express a probability pictorially.

State Performance Indicators:

SPI 0406.5.1   Depict data using various representations (e.g., tables, pictographs, line graphs, bar graphs).

SPI 0406.5.2   Solve problems using estimation and comparison within a single set of data.

SPI 0406.5.3   Given a set of data or a graph, describe the distribution of the data using median, range, or mode.

SPI 0406.5.4   List all possible outcomes of a given situation or event.