



Math Curriculum

KINDERGARTEN MATH SKILLS
Based on Tennessee Curriculum Frameworks

NUMBER AND OPERATION

The student will identify, represent, order, and compare numbers and compute and solve problems.

The following skills would be introduced in Kindergarten:

- Count to 50 by 1's and 10's.
- Count backward from 10 to 1.
- Match quantities up to 20 with numerals.
- Identify and write numerals 0-20.
- Represent quantities up to 20 on ten - frames.
- Determine if a figure has been divided into halves.
- Order numbers less than 20.
- Express the relationship between two numbers less than 20 using the words less than, more than, or equal to.
- Identify the position of a whole number less than 20 on a number line.
- Use the language of ordinal numbers up to tenth.
- Use concrete objects to develop strategies for addition and subtraction of whole numbers.
- Solve simple word problems involving whole numbers 0-10.
- Use words, actions, pictures, or concrete objects to solve problems.
- Use pictures or objects to show one more or one less than any number to 20.
- Explain if the solution to a word problem is reasonable.

The following skills would be developing in Kindergarten.

- Count how many objects are in a set (1-20).
- Identify and name coins (penny, nickel, dime, quarter, and half dollar) and their values.
- Identify equivalent sets of objects by one-to-one correspondence.

ALGEBRA

The student will sort and classify objects; create, extend, and describe patterns; and represent number sentences with words, objects, and pictures.

The following skills would be introduced in Kindergarten:

- Use mathematical terms appropriately.
- Identify patterns in the environment, in arrangements of objects, or in pictures.
- Recognize and extend a concrete, visual, or auditory two- or three-part repeating pattern.
- Create and describe a simple repeating pattern of numbers or figures.
- Use concrete objects or pictures to demonstrate addition and subtraction number sentences involving numbers 0 to 5.
- Read and explain simple addition and subtraction number sentences.

The following skills would be developing in Kindergarten:

- Sort objects by color, size, shape, and kind.

GEOMETRY

The student will identify, describe, and create basic shapes and describe relative positions and directions.

The following skills would be introduced in Kindergarten:

- Match terms with given shapes (circles, squares, triangles, and rectangles) when shown in various positions.
- Recognize circles, squares, triangles, and rectangles in the environment and as faces of three-dimensional objects.
- Recognize basic properties of and similarities and differences between simple geometric figures (e.g., number of sides, corners).
- Reproduce and create circles, squares, rectangles, and triangles.

KINDERGARTEN MATH SKILLS
Based on Tennessee Curriculum Frameworks

- Reproduce and create structures using three-dimensional shapes.
- Combine two-dimensional shapes to make pictures.
- Recognize and show terms of relative position and direction in a variety of situations (e.g., over, under, forward, backward, between, right, and left).

MEASUREMENT

The student will apply measurement concepts of time, length, weight, capacity, and temperature.

The following skills would be introduced in Kindergarten:

- Demonstrate understanding of the concept of length.
- Recognize and show which is larger/smaller, longer/shorter, taller/shorter, heavier/lighter or which holds more/holds less, when given two similar objects.
- Measure and estimate length of an object using a variety of nonstandard units.
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The following skills would be developing in Kindergarten:

- Use words to describe time (e.g., day, night, morning, afternoon, yesterday, today, and tomorrow).
- Use words to describe temperature (e.g., hot, warm, cool, and cold).
- Recognize a calendar as a way of measuring time.
- Distinguish between light and heavy objects.
- Recognize clocks and watches as instruments for measuring time and tell time to the hour.
- Recognize a thermometer as a device to measure temperature.

DATA ANALYSIS AND PROBABILITY

The student will make simple graphs using concrete objects and pictures and describe events as likely or unlikely.

The following skills would be introduced in Kindergarten:

- Represent and compare data using concrete objects, pictures, and simple graphs.
- Describe events related to students' experiences as likely or unlikely.

FIRST GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

NUMBER AND OPERATION

The student will identify, represent, order, and compare numbers and compute and solve problems.

The following skills would be introduced in First Grade:

- Count by 2's, 5's, and 10's to 100.
- Count how many objects are in a set by 2's, 5's, and 10's up to 30.
- Identify the place value of a digit in numbers to 99.
- Count by 10's from any number using a hundreds chart.
- Use concrete objects to model whole numbers to 99 (e.g., base-ten blocks, sticks, and straws).
- Identify odd and even whole numbers to 50.
- Match halves and fourths to shaded regions of a single object or figure.
- Show $\frac{1}{2}$ and $\frac{1}{4}$ of a set of objects.
- Match the spoken, written, concrete, and pictorial representations of $\frac{1}{2}$ and $\frac{1}{4}$.
- Recognize one whole as two halves or four fourths.
- Count the value of a set of coins up to 50 cents.
- Represent numbers in flexible ways using a variety of materials (e.g., 23 as 23 ones, 1 ten and 13 ones, and/or 2 tens and 3 ones).
- Compare whole numbers through 100 using the appropriate symbol (e.g., $<$, $>$, and $=$).
- Use a number line or hundreds grid to find one more or one less than any number to 50.
- Develop story problems that illustrate basic addition and subtraction facts.
- Estimate the number of objects in a group and explain the reasoning for the estimate.
- Explain and justify solutions and strategies in problem solving.
- Add and subtract up to two-digit whole numbers using various strategies (e.g., counting up or back, taking away, doubles plus one, comparison, number relationships, and modeling).
- Use calculators in problem-solving situations.

The following skills would be developing in First Grade.

- Count how many objects are in a set by 1's to 100.
- Count forward or backward by one beginning with any number less than 100.
- Read and write numerals up to 100.
- Sequence and order whole numbers less than 100.
- Identify and use ordinal numbers up to twelfth.
- Explain whether the solution to a word problem is reasonable.
- Solve simple story problems involving addition and subtraction with numbers less than 20.
- Use words, actions, pictures, and concrete objects to solve problems.
- Use pictures or objects to show one more or one less than any number to 99.

ALGEBRA

The student will sort and classify objects; create, extend, and describe patterns; and represent number sentences with words, objects, and pictures.

The following skills would be introduced in First Grade:

- Describe how objects in a group are alike and how they are different.
- Identify the unit of a two-part repeating pattern.
- Interpret and solve simple open addition sentences, including finding the missing addend.
- Apply the commutative property of addition.

The following skills would be developing in First Grade:

- Sort objects by two of the following attributes: color, size, shape, and kind.

FIRST GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

- Identify and describe growing patterns found in literature, in the environment, in physical arrangements, and in pictures.
- Translate a repeating pattern from one format to another (e.g., red-blue-blue to snap-clap-clap).
- Create, describe, and extend concrete, visual, auditory, or number patterns.
- Show or represent number sentences, involving addition and subtraction and numbers 0-20, with concrete objects.
- Use mathematical terms and symbols appropriately.

GEOMETRY

The student will identify, describe, and create basic shapes and describe relative positions and directions.

The following skills would be introduced in First Grade:

- Create a figure made up of shapes from memory.

The following skills would be developing in First Grade:

- Recognize names, basic properties of, and similarities and differences between simple geometric figures (e.g., number of sides, corners).
- Predict and describe the results of combining and taking apart two- and three-dimensional geometric figures.
- Recognize and show terms of relative position and direction in a variety of situations (e.g., over, under, forward, backward, between, right, and left).
- Identify the position of a whole number on the number line.

MEASUREMENT

The student will apply measurement concepts of time, length, weight, capacity, and temperature.

The following skills would be introduced in First Grade:

- Use a ruler to measure a line segment to the nearest inch or centimeter.
- Use scales to weigh an object to nearest pound or kilogram.
- Mark specified days and dates on a calendar and describe the relationship between days and months.
- Compare units of time.

The following skills would be developing in First Grade:

- Compare and order objects according to length, capacity, and weight.
- Recognize the need for standard units of measurement.
- Demonstrate understanding of the concept of length.
- Measure and estimate length using a variety of nonstandard units.
- Recognize that a calendar is a way of measuring time.
- Determine time to the nearest hour and half-hour, using a standard clock.
- Use a thermometer to measure temperature and determine the hotter/colder temperature by selecting the higher/lower column of two thermometers.

DATA ANALYSIS AND PROBABILITY

The student will make simple graphs using concrete objects and pictures and describe events as likely or unlikely.

The following skills would be developing in First Grade:

- Interpret and make pictographs and bar graphs using concrete objects and pictured objects.
- Describe events related to students' experiences as likely or unlikely.

SECOND GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

NUMBER AND OPERATION

The student will identify, represent, order, and compare numbers and compute and solve problems.

The following skills would be introduced in Second Grade:

- Use concrete models or pictures to show whether a fraction is less than $\frac{1}{2}$, more than $\frac{1}{2}$, or equal to $\frac{1}{2}$.
- Compare the unit fractions $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$.
- Use the number line to demonstrate addition and subtraction.
- Write and identify number sentences that describe situations involving addition and subtraction.
- Write and explain related addition and subtraction sentences.

The following skills would be developing in Second Grade.

- Count a set of objects to 100 by 2's, 3's, 5's, or 10's.
- Count forward and backward by one from any number less than 999.
- Read and write numerals to 999.
- Identify the place value of a digit in numbers to 999.
- Identify odd and even numbers to 100.
- Match the spoken or written word names and concrete or pictorial representations (parts of regions or parts of sets of objects) of halves, thirds, and fourths.
- Determine the value of a collection of coins up to \$1.00.
- Order and sequence whole numbers less than 1000.
- Compare two numbers using the appropriate symbol (i.e., $<$, $>$, and $=$).
- Represent numbers to 999 in flexible ways using a variety of materials (e.g., 23 as 23 ones, 1 ten and 13 ones, and/or 2 tens and 3 ones).
- Use and match numerals to ordinal numbers through twentieth.
- Develop a story problem that illustrates a given addition or subtraction number sentence.
- Solve story problems involving numbers to 100.
- Check for the reasonableness of solutions.
- Use calculators in problem-solving situations.
- Add and subtract efficiently and accurately with single-digit numbers up to sums of 18.
- Add and subtract two-digit whole numbers using a variety of strategies and representations.
- Explain and justify solution strategies used in problem solving.
- Use estimation to justify whether the answer to a computation is reasonable.

ALGEBRA

The student will sort and classify objects; create, extend, and describe patterns; and represent number sentences with words, objects, and pictures.

The following skills would be introduced in Second Grade:

- Determine the output number for a particular input number given a one-operation rule involving addition or subtraction.
- Describe qualitative change (e.g., a student growing taller).
- Show that subtraction is not commutative.
- Describe quantitative change (e.g., a student growing 2 inches in 1 year).

The following skills would be developing in Second Grade:

- Sort objects by two or more attributes.
- Identify the rules by which objects or numbers have been sorted.
- Extend a growing pattern, involving objects, shapes, or numbers.
- Identify the unit of a three-part repeating pattern.
- Translate a repeating pattern from one format to another (e.g., red-blue-blue to snap-clap-clap).
- Interpret and solve open sentences that involve addition or subtraction.
- Communicate and use mathematical terms and symbols appropriately.

SECOND GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

- Show or represent number sentences, involving addition and subtraction and numbers 0-20, with concrete objects.
- Demonstrate knowledge of and use the commutative property of addition.
- Apply the addition and subtraction properties of 0 (adding or subtracting 0 doesn't change a given number).

GEOMETRY

The student will identify, describe, and create basic shapes and describe relative positions and directions.

The following skills would be introduced in Second Grade:

- Identify shapes that have line symmetry.
- Illustrate flips, slides, and turns using concrete objects and pictures.

The following skills would be developing in Second Grade:

- Identify, build, draw, and compare two- and three-dimensional geometric figures.
- Describe characteristics and parts of two- and three-dimensional geometric figures.
- Investigate and predict the results of combining and taking apart two- and three-dimensional geometric figures.

The following skills would be mastered in Second Grade:

- Identify the position of a whole number on the number line.

MEASUREMENT

The student will apply measurement concepts of time, length, weight, capacity, and temperature.

The following skills would be introduced in Second Grade:

- Demonstrate understanding of the concepts of perimeter and area.
- Identify what can be measured about objects in the environment.
- Estimate lengths and time intervals.
- Solve problems involving elapsed time in hours.
- Measure and estimate weight and capacity using a variety of nonstandard units.
- Find area and perimeter using nonstandard units.

The following skills would be developing in Second Grade:

- Compare and order objects according to length, capacity, and weight.
- Identify time to the hour, half-hour, and quarter-hour.
- Relate days, dates, weeks, and months to a calendar.
- Explain the relationship between inches and feet.
- Measure length to the nearest centimeter, foot, half-inch, and inch.
- Read thermometers with Fahrenheit and Celsius scales.

DATA ANALYSIS AND PROBABILITY

The student will make simple graphs using concrete objects and pictures and describe events as likely or unlikely.

The following skills would be introduced in Second Grade:

- Pose questions and gather data to answer the questions.
- Read, interpret, and construct tables using tally marks.
- Predict outcomes of events based on data gathered and displayed.

SECOND GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

The following skills would be developing in Second Grade:

- Construct pictographs and bar graphs.
- Interpret and solve problems with tables, bar graphs, and pictographs.

The following skills would be mastered in Second Grade:

- Explain whether an event is likely or unlikely.

THIRD GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

NUMBER AND OPERATION

The student will identify, represent, order, and compare numbers and compute and solve problems.

The following skills would be introduced in Third Grade:

- Compare and order decimal amounts written as money.
- Relate skip counting to multiplication.
- Connect division to sharing situations.
- Demonstrate multiplication using repeated addition (e.g., arrays).
- Relate adding doubles to multiplying by two.
- Use known multiplication facts to determine a related product (e.g., 9×7 is 7 less than 10×7).
- Mentally calculate the sum or difference of any two numbers up to 100.

The following skills would be developing in Third Grade.

- Skip count by 10's from any whole number less than 1,000.
- Read and write whole numbers to 9,999.
- Connect the spoken or written word names and concrete or pictorial representations (regions or sets) of fractions with denominators up to ten.
- Order and sequence whole numbers up to 4 digits.
- Write and identify number sentences that describe situations involving addition, subtraction, and multiplication.
- Write and explain related addition and subtraction sentences.
- Use a variety of thinking strategies to add and subtract whole numbers (e.g., sums of ten, doubles plus one).
- Explain the reasonableness of a solution to a computation or to a word problem.
- Explain and justify solution strategies used in problem solving.
- Select and use an appropriate strategy to solve word problems (e.g., organized list, guess and check, diagram, and table).
- Use strategies, including rounding, to estimate in story problems.

The following skills would be assessed in Third Grade by the Tennessee Comprehensive Assessment Program:

- Count by 10's, 100's, or 1,000's.
- Represent whole numbers to 9,999 with models.
- Identify whole numbers as odd or even.
- Identify the place value of a given digit up to thousands.
- Represent whole numbers up to 10,000 in expanded form (e.g., 1,000's + 100's + 10's + 1's).
- Connect written and pictorial representations of fractions with denominators up to ten.
- Compare fractions with numerators of 1 and denominators up to 10.
- Recognize the value of combinations of coins and bills up to \$5.
- Determine the correct change from a transaction that is less than \$1.00.
- Compare and order whole numbers up to 9999 using the appropriate symbol (i.e., $<$, $>$, and $=$).
- Solve real-world problems using addition or subtraction of whole numbers.
- Add and subtract efficiently and accurately with single-digit whole numbers.
- Add efficiently and accurately with two- and/or three-digit whole numbers.
- Subtract efficiently and accurately with two- and/or three-digit whole numbers.
- Use estimation to select a reasonable solution in problem solving (addition and subtraction only).
- Use the multiplication facts 0, 1, 2, 5, and 10 efficiently and accurately.

THIRD GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

ALGEBRA

The student will sort and classify objects; create, extend, and describe patterns; and represent number sentences with words, objects, and pictures.

The following skills would be introduced in Third Grade:

- Demonstrate understanding that an equation is a number sentence stating two quantities are equal.
- Apply the zero and identity properties of multiplication (adding 0 or multiplying by 1 doesn't change a number).
- Use arrays to represent the commutative property of multiplication.

The following skills would be developing in Third Grade:

- Sort objects by two or more attributes.
- Recognize, describe, complete, translate, or create patterns of figures or numbers.
- Describe a growing pattern, involving objects, shapes, or numbers.
- Demonstrate knowledge (with words or symbols) of the commutative properties of addition and multiplication.
- Show or represent and solve open sentences, involving addition, subtraction, and multiplication, with concrete objects or pictures.
- Demonstrate knowledge and understanding of grade level mathematical terms.
- Use the commutative property of addition and multiplication.
- Show that subtraction is not commutative.
- Describe qualitative change (e.g., a student growing taller).
- Describe quantitative change (e.g., a student growing two inches in one year).

The following skills would be mastered in Third Grade:

- Devise, carry out, and explain how a group of objects has been sorted.
- Apply the addition and subtraction properties of 0 (adding or subtracting 0 doesn't change a number).

The following skills would be assessed in Third Grade by the Tennessee Comprehensive Assessment Program:

- Sort objects by two attributes.
- Identify the rules by which objects or numbers have been sorted.
- Extend repeating and growing numerical or geometric patterns.
- Represent repeating geometric patterns as repeating numerical patterns.
- Determine the output number for a particular input number given a one-operation function rule involving addition or subtraction.
- Solve open sentences that involve addition and subtraction of whole numbers zero to twenty.
- Connect open sentences to real-world situations.

THIRD GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

GEOMETRY

The student will identify, describe, and create basic shapes and describe relative positions and directions.

The following skills would be introduced in Third Grade:

- Identify and draw horizontal and vertical lines.
- Identify and draw diagonals of polygons.
- Identify a location on a grid using whole number coordinates.

The following skills would be developing in Third Grade:

- Identify, build, draw, and compare two- and three-dimensional geometric figures (e.g. rectangle, square, triangle, circle, cube, cylinder, sphere, and cone).
- Draw lines of symmetry in two-dimensional designs and shape.
- Identify the position of $\frac{1}{2}$, $\frac{1}{3}$, or $\frac{1}{4}$ on the number line.
- Predict and identify the results of sliding, flipping, or turning two-dimensional shapes.

The following skills would be assessed in Third Grade by the Tennessee Comprehensive Assessment Program:

- Name two-dimensional geometric figures (e.g., rectangle, square, triangle, circle, cube, cylinder, sphere, and cone).
- Name three-dimensional geometric figures (e.g., rectangle, square, triangle, circle, cube, cylinder, sphere, and cone).
- Recognize geometric figures that are the same size and shape.
- Identify the line of symmetry in a two-dimensional design or shape.
- Use appropriate mathematical language to find a point on a grid using whole number coordinates.
- Identify the result of a transformation that has been applied to a simple two-dimensional geometric shape (i.e., flips or slides).

MEASUREMENT

The student will apply measurement concepts of time, length, weight, capacity, and temperature.

The following skills would be developing in Third Grade:

- Determine when an estimate of a measurement is sufficient.
- Demonstrate understanding of the concepts of perimeter, area, and capacity.
- Use strategies to estimate or determine length, perimeter, area, capacity, weight, time, and temperature.
- Explain the relationships among inches, feet, and yards.
- Measure to the nearest centimeter, foot, half-inch, and inch.
- Measure to the nearest liter, cup, pint, quart, and gallon.
- Measure to the nearest ounce, pound, kilogram, and gram.
- Find the perimeter of polygons.
- Select and apply the most appropriate standard units of length, area, capacity, weight, time, and temperature.
- Solve real-world problems involving measurement.

The following skills would be assessed in Third Grade by the Tennessee Comprehensive Assessment Program:

- Solve real-world problems using a calendar.
- Solve real-world problems involving addition and subtraction of one- or two-digit measurements.
- Use estimation to determine if a length measurement is reasonable.
- Measure length to the nearest centimeter and inch.
- Find the perimeter of a rectangle on a grid.
- Select an appropriate standard unit to measure length.
- Solve real-world problems involving elapsed time to the half-hour.
- Read thermometers with Fahrenheit and Celsius scales (positive whole number temperatures).
- Read and write time at five-minute intervals.
- Read and write time to the nearest hour, half-hour, and quarter-hour.

THIRD GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

DATA ANALYSIS AND PROBABILITY

The student will make simple graphs using concrete objects and pictures and describe events as likely or unlikely.

The following skills would be developing in Third Grade:

- Write questions and gather data to answer questions.
- Interpret and construct tables using tally marks.
- Construct pictographs and bar graphs.
- Read and interpret tables, bar graphs, and pictographs.
- Make and justify predictions based on data gathered and displayed.
- Identify all possible outcomes of a simple experiment (e.g., spinner, coin toss, and number cubes).

The following skills would be assessed in Third Grade by the Tennessee Comprehensive Assessment Program:

- Interpret pictographs.
- Interpret bar graphs.
- Determine whether an event is certain, possible, or impossible.
- Determine the most likely, least likely, or equally likely outcomes in simple experiments (i.e., spinner, number or color cube).
- Select all possible outcomes of a simple experiment (i.e., spinner, coin toss, number or color cube).
- Solve real-world problems in which data is represented in tables.

FOURTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

NUMBER AND OPERATION

The student will identify, represent, order, and compare numbers and compute and solve problems.

The following skills would be introduced in Fourth Grade:

- Explain the relationship between multiplication and division.
- Explain how addition, subtraction, multiplication, and division affect the size and order of numbers.
- Multiply decimals (includes monetary units).
- Select appropriate methods and tools for computing with whole numbers (e.g., mental computation, estimation, calculators, paper and pencil, guess and check).
- Identify missing information and/or too much information in word problems.
- Apply logical reasoning to solve real-world problems.

The following skills would be developing in Fourth Grade.

- Use concrete or pictorial representations to compare and order commonly used fractions.
- Use concrete and pictorial representations to compare decimals.
- Use various models and equivalent forms to represent, order, and compare whole numbers and commonly used fractions and mixed numbers (e.g., number lines, base ten blocks, expanded notation, Venn diagrams, and hundreds boards).
- Demonstrate knowledge and understanding of grade level mathematical terms.
- Explain the relationship between addition and subtraction.
- Estimate the results of whole-number computations.
- Divide efficiently and accurately with single-digit whole numbers.
- Select the appropriate computational and operational method to solve word problems.
- Solve story problems using whole numbers, fractions, and decimals (includes money).

The following skills would be assessed in Fourth Grade by the Tennessee Comprehensive Assessment Program:

- Read and write numbers from hundred-thousands to hundredths.
- Represent whole numbers to 9999.
- Identify the place value of a given digit from hundred-thousands to hundredths.
- Compare and order whole numbers to 9999 using the appropriate symbols ($>$, $<$, and $=$).
- Identify fractions as parts of whole units, as parts of sets, as locations on number lines, and as divisions of whole numbers.
- Generate equivalent forms of whole numbers, commonly used fractions, and decimals.
- Represent numbers as both improper fractions and mixed numbers.
- Represent whole numbers up to 10,000 in expanded form (1,000's + 100's + 10's + 1's).
- Use estimation to select a reasonable solution to a whole number computation involving addition, subtraction, or multiplication.
- Add and subtract fractions with like denominators.
- Multiply efficiently and accurately with single-digit whole numbers.
- Add and subtract decimals (includes monetary units).
- Solve one-step real-world problems involving addition or subtraction of whole numbers and/or decimals.
- Solve one-step real-world problems involving multiplication of whole numbers and/or decimals.

ALGEBRA

The student will sort and classify objects; create, extend, and describe patterns; and represent number sentences with words, objects, and pictures.

The following skills would be introduced in Fourth Grade:

- Represent the idea of a variable as an unknown quantity by using a letter or a symbol.
- Investigate how a change in one variable relates to a change in a second variable.

The following skills would be developing in Fourth Grade:

FOURTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

- Generalize and extend or complete patterns involving geometric figures or numbers.
- Represent and analyze patterns and relationships using words, tables, and graphs.
- Demonstrate understanding that an equation is a number sentence stating that two quantities are equal.
- Use the commutative, associative, zero, and identity properties for addition and multiplication.

The following skills would be assessed in Fourth Grade by the Tennessee Comprehensive Assessment Program:

- Extend numerical and geometric patterns.
- Determine the function rule for data in a function table.
- Apply basic function rules.
- Solve open sentences involving addition and subtraction.
- Solve open sentences involving multiplication and division.
- Connect open sentences to real-world situations.

GEOMETRY

The student will identify, describe, and create basic shapes and describe relative positions and directions.

The following skills would be introduced in Fourth Grade:

- Describe the relationships between lines and the characteristics of angles (e.g., parallel, perpendicular, intersecting, right, acute, and obtuse).
- Describe a motion that will show that two shapes are congruent.
- Use geometric models to solve real-world problems.

The following skills would be developing in Fourth Grade:

- Identify, compare, and analyze attributes of two- and three-dimensional shapes.
- Develop and use mathematical language to describe characteristics and properties of geometric figures.
- Identify and draw points, lines, line segments, rays, and angles.
- Compare properties of two- and three-dimensional geometric figures.
- Investigate and describe the results of subdividing and combining two-dimensional geometric figures.
- Identify and draw lines of symmetry for two-dimensional geometric figures.
- Identify, predict, and describe the results of transformations of two-dimensional geometric figures (i.e., slides, flips, and turns).
- Construct and draw two- and three-dimensional geometric figures.
- Create and describe mental images of objects, patterns, and paths.

The following skills would be assessed in Fourth Grade by the Tennessee Comprehensive Assessment Program:

- Identify two- or three-dimensional shapes given defining attributes.
- Identify points, lines, and rays.
- Recognize congruent geometric figures.
- Identify lines of symmetry for two-dimensional geometric figures.
- Locate and specify points in Quadrant 1 of a coordinate system.
- Identify the result of a transformation (flip or slide) that has been applied to a simple two-dimensional geometric shape.

FOURTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

MEASUREMENT

The student will apply measurement concepts of time, length, weight, capacity, and temperature.

The following skills would be introduced in Fourth Grade:

- Demonstrate understanding that measurements are approximations.

The following skills would be developing in Fourth Grade:

- Demonstrate understanding of the concepts of length, perimeter, area, weight, capacity, volume, time, and angle measure.
- Estimate using standard units of measure.
- Demonstrate understanding of the relationships among units of length.
- Explore perimeter and area using a variety of models (e.g., geoboards, graph paper).
- Select and use tools to measure weight and volume in customary or metric units.
- Develop strategies for estimating the perimeters and areas (such as counting square units) of geometric figures.

The following skills would be assessed in Fourth Grade by the Tennessee Comprehensive Assessment Program:

- Use estimation to determine if a length or volume measurement is reasonable.
- Select appropriate standard units to measure length, perimeter, area, capacity, volume, weight, time, temperature, and angles.
- Find the perimeter of rectangles.
- Measure length to the nearest $\frac{1}{4}$ inch or nearest centimeter.
- Tell time to the nearest minute.
- Read temperature using Fahrenheit and Celsius thermometers.
- Apply the formula for finding the area of a rectangle.
- Solve real-world problems involving addition and subtraction of measurements.
- Solve real-world problems involving elapsed time to the quarter-hour.

DATA ANALYSIS AND PROBABILITY

The student will make simple graphs using concrete objects and pictures and describe events as likely or unlikely.

The following skills would be introduced in Fourth Grade:

- Collect data using observations, surveys, and experiments.
- Understand how data-collection methods could affect the results.
- Evaluate how well various representations show the collected data.
- Design investigations to try to answer a question.

The following skills would be developing in Fourth Grade:

- Construct tables, pictographs, line graphs, and bar graphs.
- Interpret simple charts, tables, pictographs, line graphs, and bar graphs.
- Explore and determine measures of central tendency (i.e., mean, median, and mode).
- Make predictions from data.

The following skills would be mastered in Fourth Grade:

- Describe the likelihood or chance of events as certain, possible, or impossible.
- Explain whether an event is likely or unlikely.

The following skills would be assessed in Fourth Grade by the Tennessee Comprehensive Assessment Program:

- Interpret data displayed in bar graphs and pictographs.
- Connect data in tables to pictographs, line graphs, or bar graphs.
- Determine the median of a data set.
- Determine the most likely, least likely, or equally likely outcomes in simple experiments.
- Select all possible outcomes of a simple experiment (i.e., spinner, coin toss, number or color cube).

FIFTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

NUMBER AND OPERATION

The student will identify, represent, order, and compare numbers and compute and solve problems.

The following skills would be introduced in Fifth Grade:

- Explain why one form of a number might be more useful for computation than another form.

The following skills would be developing in Fifth Grade.

- Order and compare ($<$, $>$, or $=$) whole numbers, fractions, mixed numbers, and decimals using models (e.g., number lines, base ten blocks, Venn diagrams, and hundreds boards).
- Demonstrate knowledge and understanding of grade level mathematical terms.
- Represent proper fractions, improper fractions, and mixed numbers using concrete objects, pictures, and the number line.
- Identify and change improper fractions to mixed numbers and vice versa.
- Recognize relationships among commonly used fractions and decimals.
- Explain and demonstrate the inverse nature of addition and subtraction.
- Explain and demonstrate the inverse nature of multiplication and division.
- Explain how addition, subtraction, multiplication, and division affect the size and order of numbers.
- Select appropriate methods and tools for computations (e.g., mental computation, estimation, calculators, and paper and pencil).
- Identify missing information and/or too much information in real-world problems.
- Solve real-world problems using decimals (including money), fractions, and percents.

The following skills would be mastered in Fifth Grade.

- Use commutative, associative, and identity properties.

The following skills would be assessed in Fifth Grade by the Tennessee Comprehensive Assessment Program:

- Read and write numbers from millions to thousandths.
- Identify the place value of a given digit from millions to thousandths.
- Represent whole numbers and two-place decimals in expanded form.
- Represent, compare, and order whole numbers and decimals to thousandths.
- Compare and order fractions using the appropriate symbol ($<$, $>$, and $=$).
- Connect symbolic representations of proper and improper fractions to models of proper and improper fractions.
- Represent numbers as both improper fractions and mixed numbers.
- Generate equivalent forms of commonly used fractions, decimals, and percents (e.g., $1/10$, $1/4$, $1/2$, $.75$, 50%).
- Multiply a fraction by a multiple of its denominator (denominator less than or equal to 10).
- Use estimation to determine a reasonable solution to a whole number computation.
- Add, subtract, multiply, and divide whole numbers (multipliers and divisors no more than two-digits).
- Add, subtract, and multiply decimals.
- Add and subtract commonly used fractions.
- Solve one- or two-step real-world problems involving addition, subtraction, and/or multiplication of whole numbers and decimals.

ALGEBRA

The student will sort and classify objects; create, extend, and describe patterns; and represent number sentences with words, objects, and pictures.

The following skills would be developing in Fifth Grade:

- Generalize and extend or complete patterns involving geometric figures or numbers.
- Represent and analyze patterns and functions using words, tables, and graphs.
- Determine or apply a function rule involving data in a function table.
- Represent the idea of a variable as an unknown quantity using a letter or a symbol.
- Investigate how a change in one variable relates to a change in a second variable.
- Use methods to compare and describe situations involving constant and/or varying rates of change and to solve real-world problems (e.g., extending rate charts).

FIFTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

The following skills would be mastered in Fifth Grade:

- Demonstrate understanding that an equation is a number sentence stating two quantities are equal.
- Apply commutative, associative, zero, distributive, and identity properties.
- Show that division is not commutative.

The following skills would be assessed in Fifth Grade by the Tennessee Comprehensive Assessment Program:

- Extend numerical patterns.
- Extend geometric patterns.
- Generalize numerical patterns using a variable.
- Apply basic function rules.
- Solve open sentences involving addition, subtraction, multiplication, and division.
- Connect open sentences to real-world situations.
- Select an equation that represents a given mathematical relationship.
- Extend rate charts to solve real-world problems.

GEOMETRY

The student will identify, describe, and create basic shapes and describe relative positions and directions.

The following skills would be introduced in Fifth Grade:

- Make and test hypothesis about geometric properties.
- Explore similarity and how the sides and angles of similar triangles are related.
- Describe and identify line and rotational symmetry in two-dimensional figures.
- Use visualization and spatial reasoning (e.g., geometric models) to solve problems.

The following skills would be developing in Fifth Grade:

- Identify, compare, and analyze attributes of two- and three-dimensional figures.
- Use the attributes of geometric figures to develop definitions of the figures.
- Identify and draw points, lines, line segments, rays, and angles.
- Draw circles and label diameter, circumference, radius, and center.
- Investigate and describe the results of subdividing and combining geometric figures.
- Recognize, name, compare, and contrast congruent and symmetrical geometric figures.
- Describe the relationships between lines and the characteristics of angles (e.g., parallel, perpendicular, intersecting, right, acute, obtuse, and straight).
- Describe location and movement using appropriate mathematical language.
- Identify, predict, and describe the results of transformations of two-dimensional figures (i.e., slides, flips, and turns).
- Describe a motion or a series of motions that will show that two shapes are congruent.
- Construct and draw two- and three-dimensional geometric figures.
- Create and describe mental images of objects, patterns, and paths.
- Recognize and build a 3-dimensional object from a 2-dimensional representation (net) of that object (e.g., cube, rectangular prism, pyramid, cone, or cylinder).

The following skills would be assessed in Fifth Grade by the Tennessee Comprehensive Assessment Program:

- Identify lines of symmetry in two-dimensional geometric figures.
- Identify two- or three- dimensional shapes given defining attributes.
- Identify lines, line segments, rays, and angles.
- Classify geometric figures using properties.
- Locate and specify a point in Quadrant I of a coordinate system.
- Use spatial reasoning to predict the result of sliding, flipping, or turning a two-dimensional shape.
- Use spatial reasoning to identify the three-dimensional figure created from a two-dimensional representation (net) of that figure (i.e., cube, rectangular prism, pyramid, cone, or cylinder).

FIFTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

MEASUREMENT

The student will apply measurement concepts of time, length, weight, capacity, and temperature.

The following skills would be introduced in Fifth Grade:

- Understand how differences in units affect precision of measurements.
- Develop informal strategies to determine the surface area and volume of rectangular solids.

The following skills would be developing in Fifth Grade:

- Demonstrate understanding of the concepts of length, perimeter, circumference, area, weight, capacity, volume, elapsed time, and angle measure.
- Demonstrate understanding that measurements are approximations.
- Demonstrate understanding of the relationships among the units within both customary and metric systems of measurement.
- Explore what happens to measurements of a two-dimensional shape when the shape is changed in some way (e.g., perimeter, area).
- Select and use appropriate standard units to measure length, perimeter, area, capacity, volume, weight, time, temperature, and angles.
- Select and use appropriate tools for measuring in real-world situations.
- Explain and demonstrate how scale in maps and drawings shows relative size and distance.

The following skills would be assessed in Fifth Grade by the Tennessee Comprehensive Assessment Program:

- Connect simple units of measurement within the same system of measurement.
- Use estimation to determine if a length or volume measurement is reasonable.
- Select appropriate standard units to measure length, perimeter, area, capacity, volume, weight, time, temperature, and angles.
- Use strategies to estimate perimeter and area of rectangles.
- Use a ruler to measure to the nearest centimeter and $\frac{1}{4}$ inch.
- Solve real-world problems involving addition and subtraction of measurements.
- Solve real-world problems involving perimeter and area of rectangles.
- Solve real-world problems involving elapsed time.
- Read temperatures on a thermometer using Fahrenheit and Celsius scales.
- Apply formulas to find the area of parallelograms and triangles.

DATA ANALYSIS AND PROBABILITY

The student will make simple graphs using concrete objects and pictures and describe events as likely or unlikely.

The following skills would be introduced in Fifth Grade:

- Find the range of a data set.
- Explain the importance of sample size in investigations.

The following skills would be developing in Fifth Grade:

- Collect data using observations, surveys, and experiments.
- Understand how data-collection methods could affect the results.
- Represent data using pictographs, bar graphs, tables, circle graphs, and line graphs.
- Interpret data displayed in pictographs, bar graphs, tables, circle graphs, and line graphs.
- Use measures of central tendency (i.e., mean, median, and mode).
- Make predictions and justify conclusions based on data.
- Design investigations to address a question.
- Examine various graphical representations of data to evaluate how accurately the data is depicted.
- Describe the likelihood or chance of events as likely, unlikely, certain, equally likely, or impossible.
- Use a sample space to predict the probability of an event.

FIFTH GRADE MATH SKILLS
Based on Tennessee Curriculum Frameworks

The following skills would be assessed in Fifth Grade by the Tennessee Comprehensive Assessment Program:

- Represent and interpret data in bar graphs and pictographs.
- Determine the mean, median, and mode of a data set.
- Make predictions based on data.
- Determine the most likely, least likely, or equally likely outcomes in simple experiments.
- Represent the likelihood of an event using a fractional number from zero to one.