

Course Syllabus

Mathematics, Grade 4

Jefferson County Schools Curriculum, Final
Jefferson County Schools

The Terra Nova Complete Battery for Mathematics is "designed to help students show what they know and can do. Many questions call for critical thinking, reasoning, and problem solving. Questions allow students to use different strategies and to take individual paths to a solution. Real-world topics engage students' interest, and the extensive use of graphics reduces the need for explanatory text and provides a supportive context. Themes group items into meaningful configurations, and items are generally sequenced to promote initial success so that students will continue with confidence to more challenging questions.

The [Terra Nova] tests taps broad mathematical power, yet retains the specifics from the traditional curriculum. The first section of the test includes computation, computation in context, and estimation items, and is administered without calculators. The second section covers a broad range of core skills and may be administered with calculators. Some questions require the use of rulers, which are supplied with the testing materials."

The Tennessee Mathematics Curriculum Standards provide standards, performance indicators, and accomplishments for students in mathematics.

The Terra Nova Complete Battery assesses students in fourth grade (Level 14).

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Algebraic Concepts

The Algebraic Concepts Unit includes Competencies/Objectives which focus on algebraic equations and operations. Students explore the symbolic nature of algebraic concepts by identifying and extending patterns in algebra, by following algebraic procedures, and by proving theorems with properties.

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by proving theorems with properties.

- The learner will be able to (ESSENTIAL) obtain solutions to real world problems that involve computations.
- The learner will be able to (IMPORTANT) comprehend that an equation is a number sentence which expresses that two quantities are equal.
- The learner will be able to (ESSENTIAL) comprehend the concept of equations.
- The learner will be able to (ESSENTIAL) apply basic function rules.
- The learner will be able to (ESSENTIAL) comprehend the concept of a function.
- The learner will be able to (ESSENTIAL) recognize a function rule for data in a function table.
- The learner will be able to (IMPORTANT) interpret and obtain solutions to open sentences using the four operations.
- The learner will be able to (ESSENTIAL) solve open sentences involving addition and subtraction.
- The learner will be able to (ESSENTIAL) solve open sentences involving multiplication and division.
- The learner will be able to (ESSENTIAL) comprehend the concepts of operation sense.
- The learner will be able to (ESSENTIAL) represent operations.
- The learner will be able to (IMPORTANT) continue geometric patterns.
- The learner will be able to (ESSENTIAL) extend numerical and geometric patterns geometric patterns.
- The learner will be able to (IMPORTANT) use words, tables, and graphs to represent and study patterns and functions.
- The learner will be able to (IMPORTANT) apply commutative, associative, zero, and identity properties.

Course Syllabus

Mathematics, Grade 4

Jefferson County Schools Curriculum, Final
Jefferson County Schools

- The learner will be able to (IMPORTANT) explore how a change in one variable relates to a change in another variable.
- The learner will be able to (IMPORTANT) illustrate the concept of a variable as an unknown quantity using a letter or a symbol.

Data Analysis and Probability

- The learner will be able to (IMPORTANT) interpret data shown in tables, pictographs, line graphs, and bar graphs line graph.
- The learner will be able to (ESSENTIAL) interpret information given in bar graphs and pictographs.
- The learner will be able to (ESSENTIAL) read bar graphs.
- The learner will be able to (ESSENTIAL) make comparisons of data.
- The learner will be able to (IMPORTANT) create questions and gather, organize, and illustrate data to answer those questions.
- The learner will be able to (ESSENTIAL) draw conclusions from data.
- The learner will be able to (IMPORTANT) evaluate how well many different representations demonstrate the gathered data.
- The learner will be able to (IMPORTANT) comprehend how data collection techniques affect the nature of the data set.
- The learner will be able to (IMPORTANT) use observations, surveys, and experiments to gather data.
- The learner will be able to (ESSENTIAL) formulate predictions about the probability of outcomes for elementary experiments(i.e., spinner, coin toss, number or color cube).
- The learner will be able to (IMPORTANT) illustrate data using tables, pictographs, line graphs, and bar graphs.

- The learner will be able to (IMPORTANT) explain the likelihood or chance of events as certain, possible, or impossible.
- The learner will be able to (ESSENTIAL) determine the median of a data set.
- The learner will be able to (IMPORTANT) formulate and justify predictions according to sample data.
- The learner will be able to (ESSENTIAL) identify the probability of a given situation.
- The learner will be able to (IMPORTANT) design investigations to address a question.
- The learner will be able to (IMPORTANT) comprehend the basic concept of probability.
- The learner will be able to (ESSENTIAL) determine the most likely, least likely, or equally likely outcomes in simple experiments (Learning Accomplishment includes 'likely or unlikely').
- The learner will be able to (ESSENTIAL) obtain solutions to problems by applying data.
- The learner will be able to (IMPORTANT) choose suitable statistical methods to analyze data including measures of central tendency (i.e., mean, median, mode).
- The learner will be able to (ESSENTIAL) connect data in tables to pictographs, line graphs, or bar graphs.

Geometry

The Geometry Unit includes Competencies/Objectives which focus on exploring geometric concepts from multiple perspectives. Students study properties and construction of figures, proofs and theorems, history of geometry, transformations, logic, and problem solving.

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Jefferson County Schools

- The learner will be able to (IMPORTANT) identify, compare, and analyze attributes of two-and-three-dimensional shapes.
- The learner will be able to (IMPORTANT) explain the characteristics of geometric shapes by generating and applying mathematical vocabulary.
- The learner will be able to (ESSENTIAL) combine geometric figures in creating other geometric figures.
- The learner will be able to (ESSENTIAL) recognize congruent figures.
- The learner will be able to (IMPORTANT) apply suitable mathematical vocabulary to locate and specify points on a grid using whole number coordinates.
- The learner will be able to (ESSENTIAL) apply an understanding of the coordinate system.
- The learner will be able to (IMPORTANT) draw points, lines, line segments, rays, and angles.
- The learner will be able to (IMPORTANT) describe characteristics of lines and angles (e.g., parallel, perpendicular, intersecting, right, acute, obtuse).
- The learner will be able to (IMPORTANT) create and describe mental images of objects, patterns, and paths.
- The learner will be able to (ESSENTIAL) identify parallel lines.
- The learner will be able to (ESSENTIAL) identify perpendicular lines.
- The learner will be able to (ESSENTIAL) identify points, lines, and rays.
- The learner will be able to (IMPORTANT) solve real world application problems using geometric models.
- The learner will be able to (IMPORTANT) construct and draw two-dimensional shapes.
- The learner will be able to (IMPORTANT) describe and compare the properties of two-and three-dimensional solids.
- The learner will be able to (ESSENTIAL) locate and specify points in Quadrant 1 of a coordinate system.
- The learner will be able to (IMPORTANT) explain the results of subdividing and combining two-dimensional shapes.
- The learner will be able to (ESSENTIAL) identify lines of symmetry for two-dimensional figures.
- The learner will be able to (IMPORTANT) explain a motion that will demonstrate that two figures are congruent.
- The learner will be able to (IMPORTANT) investigate, predict, and describe the results of transformations of two-dimensional geometric figures (i.e., slides, flips, turns).
- The learner will be able to (ESSENTIAL) identify the result of a transformation (flip or slide) that has been applied to a simple two-transformation shape.
- The learner will be able to (ESSENTIAL) identify the attributes of two- or three-dimensional shapes.
- The learner will be able to (ESSENTIAL) use the concepts, properties, and relationships of two-dimensional shapes.
- The learner will be able to (ESSENTIAL) use the concepts, properties, and relationships of three-dimensional solids.
- The learner will be able to (ESSENTIAL) use spatial reasoning to solve problems.
- The learner will be able to (ESSENTIAL) subdivide figures.
- The learner will be able to (ESSENTIAL) recognize symmetry.

Measurement

The Measurement Unit includes Competencies/Objectives which focus on measurement concepts, applications, and analysis. Students study length, area, circumference, perimeter, volume, weight, formulas, distance, calendar, money, tools, accuracy, units, constructions, patterns, and problem solving.

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Mathematics, Grade 4

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- The learner will be able to (IMPORTANT) show an understanding of the approximate nature of measurement.
- The learner will be able to (ESSENTIAL) calculate the area of a given figure.
- The learner will be able to (IMPORTANT) explore perimeter and area using a variety of models (e.g., geoboards, graph paper).
- The learner will be able to (ESSENTIAL) perform measurement conversions from one unit to another.
- The learner will be able to (ESSENTIAL) use estimation to determine if a length or volume measurement is reasonable.
- The learner will be able to (IMPORTANT) choose instruments to measure weight and volume.
- The learner will be able to (ESSENTIAL) find the measure of length to the nearest quarter-inch or centimeter.
- The learner will be able to (ESSENTIAL) measure mass.
- The learner will be able to (IMPORTANT) comprehend the relationships among the units within a linear measurement system.
- The learner will be able to (ESSENTIAL) make measurement estimations.
- The learner will be able to (IMPORTANT) comprehend the concepts of perimeter, length, area, weight, capacity, volume, time, and angle measure.
- The learner will be able to (IMPORTANT) comprehend the measurable characteristics of objects and the units, systems, and processes of measurement.

- The learner will be able to (IMPORTANT) use various methods, tools, and formulas to determine measurements.
- The learner will be able to (ESSENTIAL) perform calculations with money.
- The learner will be able to (ESSENTIAL) solve real-world problems involving addition and subtraction of measurement.
- The learner will be able to (ESSENTIAL) find the perimeter of a rectangle.
- The learner will be able to (ESSENTIAL) determine time to the nearest minute.
- The learner will be able to (ESSENTIAL) obtain solutions to real world problems that involve elapsed time to the quarter hour.
- The learner will be able to (ESSENTIAL) apply Fahrenheit and Celsius scales to record temperatures.
- The learner will be able to (ESSENTIAL) use a ruler.
- The learner will be able to (ESSENTIAL) identify a suitable unit of measure for use in a particular situation.
- The learner will be able to (ESSENTIAL) measure weight.

Number and Operations

- The learner will be able to (ESSENTIAL) add and subtract decimals including money amounts (Learning Accomplishment includes "multiply").
- The learner will be able to (ESSENTIAL) add and subtract fractions with the same denominator.
- The learner will be able to (IMPORTANT) describe the relationship between addition and subtraction.
- The learner will be able to (IMPORTANT) relate the effects of the four basic operations on size and order of numbers.
- The learner will be able to (IMPORTANT) apply concrete and illustrative models to compare decimals.

Course Syllabus

Mathematics, Grade 4

Jefferson County Schools Curriculum, Final
Jefferson County Schools

- The learner will be able to (IMPORTANT) illustrate, order, and compare whole numbers and common fractions and mixed numbers by applying a variety of models (e.g., number lines, base ten blocks, Venn diagrams, hundreds boards).
- The learner will be able to (IMPORTANT) apply models to compare and order common fractions.
- The learner will be able to (ESSENTIAL) compare and order whole numbers to 9999 by applying suitable symbols ($<$, $>$, $=$).
- The learner will be able to (IMPORTANT) apply mathematical vocabulary and symbols appropriately.
- The learner will be able to (IMPORTANT) apply methods for estimating solutions to any whole-number computation.
- The learner will be able to (IMPORTANT) choose suitable tools for computing with whole numbers (e.g., mental computation, estimation, calculation, paper and pencil, guess and check).
- The learner will be able to (ESSENTIAL) perform computations in the context of given problems.
- The learner will be able to (ESSENTIAL) correctly perform various computations.
- The learner will be able to (ESSENTIAL) determine divisibility.
- The learner will be able to (ESSENTIAL) use estimation in solving problems.
- The learner will be able to (ESSENTIAL) make estimations with money.
- The learner will be able to (ESSENTIAL) identify and formulate equivalent forms of whole numbers and common fractions and decimals.
- The learner will be able to (ESSENTIAL) conceptually understand expanded notation.
- The learner will be able to (ESSENTIAL) find factors.
- The learner will be able to (ESSENTIAL) illustrate fractions as parts of wholes, as parts of a group, as locations on a number line, and as the division of whole numbers.
- The learner will be able to (ESSENTIAL) develop an understanding of the concept of fractional parts.
- The learner will be able to (IMPORTANT) use logical reasoning to obtain solutions to real world problems.
- The learner will be able to (IMPORTANT) identify when information is missing or extraneous in real world problems.
- The learner will be able to (ESSENTIAL) model problem scenarios.
- The learner will be able to (ESSENTIAL) model problem solutions.
- The learner will be able to (ESSENTIAL) find multiples.
- The learner will be able to (IMPORTANT) multiply decimals including money amounts.
- The learner will be able to (ESSENTIAL) perform multiplication and division of one-digit whole numbers efficiently and accurately.
- The learner will be able to (ESSENTIAL) apply number lines.
- The learner will be able to (IMPORTANT) comprehend numbers, ways of representing numbers, numbers among numbers, and number systems.
- The learner will be able to (ESSENTIAL) identify numbers.
- The learner will be able to (ESSENTIAL) comprehend the concept of percent.
- The learner will be able to (ESSENTIAL) represent whole numbers up to 10,000 in expanded form (1000 's+ 100 's+ 10 's+ 1 's).
- The learner will be able to (ESSENTIAL) represent numbers as both improper fractions and mixed numbers.

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- The learner will be able to (ESSENTIAL) represent whole numbers to 9999.
- The learner will be able to (IMPORTANT) choose a suitable operational procedure to solve problems.
- The learner will be able to (IMPORTANT) comprehend the meanings and relationships among operations.
- The learner will be able to (ESSENTIAL) comprehend number patterns.
- The learner will be able to (ESSENTIAL) understand and/or apply geometric patterns.
- The learner will be able to (ESSENTIAL) use number patterns.
- The learner will be able to (ESSENTIAL) identify the place value of a given digit from hundredths to hundred thousands.
- The learner will be able to (ESSENTIAL) understand the concept of place value.
- The learner will be able to (IMPORTANT) solve problems, compute fluently, and make reasonable estimates.
- The learner will be able to (ESSENTIAL) obtain solutions to real world problems that involve addition and subtraction of whole numbers.
- The learner will be able to (IMPORTANT) obtain solutions to real world problems that involve single-step multiplication.
- The learner will be able to (ESSENTIAL) obtain solutions to non-routine problems.
- The learner will be able to (IMPORTANT) obtain solutions to problems in which fractions are used in real life.
- The learner will be able to (ESSENTIAL) obtain solutions to real world problems involving addition, subtraction, or multiplication of whole numbers and/or decimals.
- The learner will be able to (IMPORTANT) describe the relationship between multiplication and division.
- The learner will be able to (ESSENTIAL) read numbers.
- The learner will be able to (ESSENTIAL) read and write numbers from hundredths to hundred thousands.
- The learner will be able to (ESSENTIAL) evaluate the reasonableness of a given solution.