

Course Syllabus

Mathematics, Grade 8

Middle School, Review
Jefferson County Schools

The Tennessee TCAP Achievement Test provides standards for mathematics.

The Tennessee TCAP Achievement Test for mathematics provides standards for eighth grade.

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.

- The learner will be able to explore and relate the concept of variable.
- The learner will be able to obtain solutions to and/or explore systems of equations.
- The learner will be able to recall basic multiplication facts.
- The learner will be able to conceptually understand order of operations.
- The learner will be able to perform computations using the order of operations.
- The learner will be able to comprehend the concept of equations.
- The learner will be able to obtain solutions to linear equations.
- The learner will be able to formulate various types of problems.
- The learner will be able to understand the concepts of inequalities.
- The learner will be able to identify the absolute value of a given number.
- The learner will be able to understand absolute value.
- The learner will be able to understand the concept of an expression.

- The learner will be able to simplify expressions.
- The learner will be able to graph a quadratic equation on the coordinate plane.
- The learner will be able to find solutions to quadratic equations.
- The learner will be able to apply exponents.
- The learner will be able to demonstrate an understanding of the properties of various operations.
- The learner will be able to comprehend the concepts of operation sense.
- The learner will be able to represent operations.
- The learner will be able to comprehend rules for algebra.
- The learner will be able to calculate simple rates.
- The learner will be able to perform computations with exponents.
- The learner will be able to perform computations with roots.
- The learner will be able to perform computations with radicals.
- The learner will be able to solve problems by applying algebraic properties.
- The learner will be able to solve given equations.

Data Interpretation

The Data Interpretation Unit includes Competencies/Objectives which focus on the study and use of graphical forms. Students collect and classify data, organize and display data, use logical reasoning, and problem solving.

- The learner will be able to construct and/or finish a data display.
- The learner will be able to read circle graphs.

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- The learner will be able to read bar graphs.
- The learner will be able to read pictographs.
- The learner will be able to read a line graph.
- The learner will be able to read information in a table and/or chart.
- The learner will be able to read a diagram.
- The learner will be able to understand sorting methods.
- The learner will be able to understand grouping methods.
- The learner will be able to make interpretations of data displays.
- The learner will be able to restructure a data display for various reasons.

Decimals

The Decimals Unit includes Competencies/Objectives which focus on number sense and operations with decimals. Students compare and compute decimals, study money, estimate decimals, problem solve using decimals, and reason using decimals.

- The learner will be able to add decimals.
- The learner will be able to subtract decimals.
- The learner will be able to multiply decimals.
- The learner will be able to divide decimals.

Fractions

The Fractions Unit includes Competencies/Objectives which focus on number sense and operations with fractions. Students compare and order fractions, study fraction parts, estimate with fractions, reason using fractions, and problem solve using fractions.

- The learner will be able to add fractions.
- The learner will be able to subtract fractions.

- The learner will be able to multiply fractions.
- The learner will be able to perform division on fractions.
- The learner will be able to develop an understanding of the concept of fractional parts.

Functions

The Functions Unit includes Competencies/Objectives which focus on exploring polynomial, rational, exponential, logarithmic, trigonometric, and circular functions.

- The learner will be able to comprehend the concept of a function.
- The learner will be able to comprehend rules for functions.

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.

- The learner will be able to use the concepts, properties, and relationships of three-dimensional solids.
- The learner will be able to use the concepts, properties, and relationships of two-dimensional shapes.
- The learner will be able to interpret, complete, and apply geometric proofs.
- The learner will be able to connect two-dimensional and three-dimensional representations.
- The learner will be able to identify figures that are similar and/or congruent.
- The learner will be able to comprehend the concept of an angle.
- The learner will be able to measure angles.
- The learner will be able to comprehend triangle concepts.

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- The learner will be able to identify and define circle parts.
- The learner will be able to apply the Pythagorean Theorem.
- The learner will be able to apply the properties and concepts of transformations.
- The learner will be able to use spatial reasoning to solve problems.
- The learner will be able to use spatial reasoning skills.
- The learner will be able to apply inductive and deductive reasoning to solve problems.
- The learner will be able to understand the concepts of planes, points, lines, and rays.
- The learner will be able to recognize symmetry.
- The learner will be able to apply the geometric properties.
- The learner will be able to obtain solutions to problem situations with geometric models.
- The learner will be able to apply geometric constructions to obtain solutions to real world and mathematical problems.
- The learner will be able to obtain solutions to problems using spatial visualization.
- The learner will be able to subdivide figures.
- The learner will be able to combine geometric figures in creating other geometric figures.
- The learner will be able to identify parallel lines.
- The learner will be able to identify perpendicular lines.

Integers

The Integers Unit includes Competencies/Objectives which focus on number sense and operations with integers. Students compare integers, perform operations with integers, convert integers to other number forms, use manipulatives to demonstrate integers, and solve problems with integers in real world contexts.

- The learner will be able to add integers.
- The learner will be able to subtract integers.
- The learner will be able to multiply integers.
- The learner will be able to divide integers.
- The learner will be able to perform multiple operations on integers.

Mathematics Processes

The Mathematics Processes Unit includes Competencies/Objectives which focus on mathematical connections. Students communicate and model concepts and procedures.

- The learner will be able to relate models to concepts and/or ideas.
- The learner will be able to describe thinking.
- The learner will be able to make evaluations of ideas.
- The learner will be able to model numbers by applying set models.
- The learner will be able to model mathematical scenarios.
- The learner will be able to model problem scenarios.
- The learner will be able to model problem solutions.
- The learner will be able to formulate conjectures.
- The learner will be able to make evaluations of conjectures.

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.

- The learner will be able to identify and understand how money is used.

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- The learner will be able to identify a suitable unit of measure for use in a particular situation.
- The learner will be able to apply nonstandard units in measurement situations.
- The learner will be able to solve problems involving indirect measures.
- The learner will be able to develop an understanding of calendars and their uses.
- The learner will be able to determine the length of an object.
- The learner will be able to solve problems involving time.
- The learner will be able to perform calculations with money.
- The learner will be able to understand temperature concepts in problem solving situations.
- The learner will be able to determine the perimeter of a geometric figure.
- The learner will be able to calculate the area of a given figure.
- The learner will be able to measure weight.
- The learner will be able to determine the circumference of a circle.
- The learner will be able to measure mass.
- The learner will be able to measure capacity.
- The learner will be able to apply scales in maps.
- The learner will be able to use scale drawings.
- The learner will be able to construct two- and three-dimensional scale models of common objects.
- The learner will be able to make measurement estimations.
- The learner will be able to determine the degree of accuracy of a measurement.
- The learner will be able to determine precision of measurement.
- The learner will be able to understand the concepts of measurement.
- The learner will be able to measure distance.
- The learner will be able to perform measurement conversions from one unit to another.
- The learner will be able to use a ruler.
- The learner will be able to use the appropriate measurement instrument (ruler, thermometer, etc.) when measuring a specific attribute.

Number Theory

The Number Theory Unit includes Competencies/Objectives which focus on manipulating number forms and classifications. Students make connections between number forms and their real world applications.

- The learner will be able to comprehend the concepts of ratio and/or proportion.
- The learner will be able to understand and/or apply roots and/or radicals.
- The learner will be able to understand the concept of place value.
- The learner will be able to identify odd numbers.
- The learner will be able to identify even numbers.
- The learner will be able to conceptually understand expanded notation.
- The learner will be able to identify numbers.
- The learner will be able to recognize the applications of numbers and number relations in the real world.
- The learner will be able to display a knowledge of number sense.
- The learner will be able to read numbers.

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- The learner will be able to comprehend the concepts of equivalent forms.
- The learner will be able to apply mathematical notations appropriately.
- The learner will be able to use proportional reasoning to solve story problems.
- The learner will be able to identify prime and composite numbers.
- The learner will be able to find multiples.
- The learner will be able to find factors.
- The learner will be able to determine divisibility.
- The learner will be able to apply scientific notation.
- The learner will be able to comprehend number systems.

Numeration

The Numeration Unit includes Competencies/Objectives which focus on exploring ordinality, identifying and extending number patterns, comparing numbers, and demonstrating number relationships.

- The learner will be able to understand and/or apply geometric patterns.
- The learner will be able to determine the reasonableness of computations and numerical estimations.
- The learner will be able to use estimation in solving problems.
- The learner will be able to comprehend number patterns.
- The learner will be able to use number patterns.
- The learner will be able to solve problems using counting.
- The learner will be able to understand ordinal numbers.
- The learner will be able to find an element that is missing in a pattern.

- The learner will be able to identify when it is appropriate to estimate.
- The learner will be able to make estimations with money.
- The learner will be able to apply number lines.
- The learner will be able to compare and order numbers.
- The learner will be able to correctly perform various computations.
- The learner will be able to perform computations in the context of given problems.
- The learner will be able to round numbers to the desired degree of accuracy.
- The learner will be able to develop a comprehension of the properties of numbers.
- The learner will be able to understand rules for patterns.

Percents

The Percent Unit includes Competencies/Objectives which focus on the concepts of percent. Students perform operations with percents, convert percents to other number forms, use manipulatives to demonstrate percents, and solve problems with percents in real world contexts.

- The learner will be able to comprehend the concept of percent.
- The learner will be able to perform computations with percents.

Probability/Statistics

The Probability/Statistics Unit includes Competencies/Objectives which focus on data analysis and probability concepts. Students collect, analyze, and make sense of real world data (including overlapping data, inconclusive data, etc.).

- The learner will be able to describe and/or evaluate data.

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- The learner will be able to understand concepts, processes, and properties of statistics.
- The learner will be able to identify the probability of a given situation.
- The learner will be able to make comparisons of data.
- The learner will be able to evaluate conclusions that are based on data.
- The learner will be able to comprehend the concepts of sampling.
- The learner will be able to comprehend the concept of permutations.
- The learner will be able to comprehend the concept of combinations.
- The learner will be able to form inferences from gathered data.
- The learner will be able to draw conclusions from data.
- The learner will be able to obtain solutions to problems by applying data.
- The learner will be able to choose a suitable display to illustrate a data set.

Problem Solving

The Problem Solving Unit includes

Competencies/Objectives which focus on analyzing problems, evaluating solutions, exploring problems, and developing strategies for solving problems.

- The learner will be able to identify when information is extraneous or missing.
- The learner will be able to evaluate the reasonableness of a given solution.
- The learner will be able to explain various strategies.
- The learner will be able to describe the solution process used.
- The learner will be able to apply manipulatives to solve a problem.

- The learner will be able to develop a strategy for solving a problem.
- The learner will be able to generalize solutions to problems in order to apply them to a wide variety of contexts.
- The learner will be able to obtain solutions to non-routine problems.

Real Numbers and the Coordinate Plane

The Real Numbers and the Coordinate Plane Unit includes Competencies/Objectives which focus on graphing concepts. Students graph equations and make connections between algebraic concepts and their geometric correspondences.

- The learner will be able to apply an understanding of the coordinate system.
- The learner will be able to graph a linear equation.

Whole Numbers

The Whole Numbers Unit includes

Competencies/Objectives which focus on whole number concepts. Students perform operations with whole numbers, use manipulatives to demonstrate whole number concepts, and solve problems with whole numbers in real world contexts.

- The learner will be able to add whole numbers without regrouping.
- The learner will be able to add whole numbers, regrouping when necessary.
- The learner will be able to subtract whole numbers without regrouping.
- The learner will be able to subtract whole numbers, regrouping when necessary.
- The learner will be able to multiply whole numbers without regrouping.
- The learner will be able to multiply whole numbers, regrouping when necessary.

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- The learner will be able to divide whole numbers with no remainders.
- The learner will be able to divide whole numbers when remainders are present.