

3-5 Mathematics Georgia Performance Standards

K-12 Mathematics Introduction

The Georgia Mathematics Curriculum focuses on actively engaging the students in the development of mathematical understanding by using manipulatives and a variety of representations, working independently and cooperatively to solve problems, estimating and computing efficiently, and conducting investigations and recording findings. There is a shift towards applying mathematical concepts and skills in the context of authentic problems and for the student to understand concepts rather than merely follow a sequence of procedures. In mathematics classrooms, students will learn to think critically in a mathematical way with an understanding that there are many different ways to a solution and sometimes more than one right answer in applied mathematics. Mathematics is the economy of information. The central idea of all mathematics is to discover how knowing some things well, via reasoning, permit students to know much else—without having to commit the information to memory as a separate fact. It is the connections, the reasoned, logical connections that make mathematics manageable. As a result, implementation of Georgia's Performance Standards places a greater emphasis on problem solving, reasoning, representation, connections, and communication.

Georgia Mathematics Performance Standards Grade 3

By the end of grade three, students will understand place value. They will further develop their understanding and their skills with addition and subtraction of whole numbers and decimals. They will also expand their knowledge base of multiplication and division of whole numbers. Students will understand the concepts of length, perimeter, area, and time. Students will broaden their understanding of characteristics of previously studied geometric figures. They will solve problems by collecting, organizing, displaying, and interpreting data.

Instruction and assessment should include the use of manipulatives and appropriate technology. Topics should be represented in multiple ways including concrete/pictorial, verbal/written, numeric/data-based, graphical, and symbolic. Concepts should be introduced and used in the context of real world phenomena.

Concepts / Skills to Maintain

Comparison of numbers
Addition & subtraction of multi-digit numbers
Length (cm, m, in, ft, yd) and time
Geometric shapes
Make change
Area models (arrays) of multiplication

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Grade 3

NUMBER AND OPERATIONS

Students will use decimal fractions and common fractions to represent parts of a whole. They will also understand the four arithmetic operations for whole numbers and use them in basic calculations, and apply them in problem solving situations.

M3N1. Students will further develop their understanding of whole numbers and decimals and ways of representing them.

- a. Identify place values from tenths through ten thousands.
- b. Understand the relative sizes of digits in place value notation (10 times, 100 times, $1/10$ of a single digit whole number) and ways to represent them including word name, standard form, and expanded form.

M3N2. Students will further develop their skills of addition and subtraction and apply them in problem solving.

- a. Use the properties of addition and subtraction to compute and verify the results of computation.
- b. Use mental math and estimation strategies to add and subtract.
- c. Solve problems requiring addition and subtraction.
- d. Model addition and subtraction by counting back change using the fewest number of coins.

M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving.

- a. Describe the relationship between addition and multiplication, i.e. multiplication is defined as repeated addition.
- b. Know the multiplication facts with understanding and fluency to 10×10 .
- c. Use arrays and area models to develop understanding of the distributive property and to determine partial products for multiplication of 2- or 3-digit numbers by a 1-digit number.
- d. Understand the effect on the product when multiplying by multiples of 10.
- e. Apply the identity, commutative, and associative properties of multiplication and verify the results.
- f. Use mental math and estimation strategies to multiply.
- g. Solve problems requiring multiplication.

M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.

- a. Understand the relationship between division and multiplication and between division and subtraction.
- b. Recognize that division may be two situations: the first is determining how many equal parts of a given size or amount may be taken away from the whole as in repeated subtraction, and the second is determining the size of the parts when the whole is separated into a given number of equal parts as in a sharing model.

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- c. Recognize problem-solving situations in which division may be applied and write corresponding mathematical expressions.
- d. Explain the meaning of a remainder in division in different circumstances.
- e. Divide a 2 and 3-digit number by a 1-digit divisor.
- f. Solve problems requiring division.
- g. Use mental math strategies to divide.

M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.

- a. Identify fractions that are decimal fractions and/or common fractions.
- b. Understand that a decimal fraction (i.e. $3/10$) can be written as a decimal (i.e. 0.3).
- c. Understand the fraction a/b represents a equal sized parts of a whole that is divided into b equal sized parts.
- d. Know and use decimal fractions and common fractions to represent the size of parts created by equal divisions of a whole.
- e. Understand the concept of addition and subtraction of decimal fractions and common fractions with like denominators.
- f. Model addition and subtraction of decimal fractions and common fractions with like denominators.
- g. Use mental math and estimation strategies to add and subtract decimal fractions and common fractions with like denominators.
- h. Solve problems involving decimal fractions and common fractions with like denominators.

MEASUREMENT

Students will understand and measure time and length. They will also model and calculate perimeter and area of simple geometric figures.

M3M1. Students will further develop their understanding of the concept of time by determining elapsed time of a full, half, and quarter-hour.

M3M2. Students will measure length choosing appropriate units and tools.

- a. Use the units kilometer (km) and mile (mi.) to discuss the measure of long distances.
- b. Measure to the nearest $\frac{1}{4}$ inch, $\frac{1}{2}$ inch and millimeter (mm) in addition to the previously learned inch, foot, yard, centimeter, and meter.
- c. Estimate length and represent it using appropriate units.
- d. Compare one unit to another within a single system of measurement.

M3M3. Students will understand and measure the perimeter of geometric figures.

- a. Understand the meaning of the linear unit and measurement in perimeter.
- b. Understand the concept of perimeter as being the length of the boundary of a geometric figure.

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- c. Determine the perimeter of a geometric figure by measuring and summing the lengths of the sides.

M3M4. Students will understand and measure the area of simple geometric figures (squares and rectangles).

- a. Understand the meaning of the square unit and measurement in area.
- b. Model (by tiling) the area of a simple geometric figure using square units (square inch, square foot, etc.).
- c. Determine the area of squares and rectangles by counting, addition, and multiplication with models.

GEOMETRY

Students will further develop their understanding of characteristics of previously studied geometric figures.

M3G1. Students will further develop their understanding of geometric figures by drawing them. They will also state and explain their properties.

- a. Draw and classify previously learned fundamental geometric figures and scalene, isosceles, and equilateral triangles.
- b. Identify and compare the properties of fundamental geometric figures.
- c. Examine and compare angles of fundamental geometric figures.
- d. Identify the center, diameter, and radius of a circle.

ALGEBRA

Students will understand how to express relationships as mathematical expressions.

M3A1. Students will use mathematical expressions to represent relationships between quantities and interpret given expressions.

- a. Describe and extend numeric and geometric patterns.
- b. Describe and explain a quantitative relationship represented by a formula (such as the perimeter of a geometric figure).
- c. Use a symbol, such as \square and Δ , to represent an unknown and find the value of the unknown in a number sentence.

DATA ANALYSIS AND PROBABILITY

Students will gather, organize, and display data and interpret graphs.

M3D1. Students will create and interpret simple tables and graphs.

- a. Solve problems by organizing and displaying data in charts, tables, and graphs.
- b. Construct and interpret line plot graphs, pictographs, Venn diagrams, and bar graphs using scale increments of 1, 2, 5, and 10.

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Grade 3

Process Skills

Each topic studied in this course should be developed with careful thought toward helping every student achieve the following process standards.

M3P1. Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

M3P2. Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

M3P3. Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

M3P4. Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

M3P5. Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

3-5 Mathematics Georgia Performance Standards ***Grade 3***

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

The definitions are for teacher reference only and are not intended to be memorized by students. Teachers should present these concepts to students with models and real life examples. Students should understand the concepts involved and be able to recognize and/or demonstrate them with words, models, pictures, or numbers.

Terms / Symbols:

quotient, whole number, decimal point, place value of 1/10 (tenth), numerator, denominator, second (unit of time), \div , \times , decimal fraction, common fraction, elapsed time, scalene triangle, isosceles triangle, equilateral triangle, bar graph, mile, kilometer, center, diameter, radius, line plot graph

3-5 Mathematics Georgia Performance Standards ***Grade 4***

By the end of grade four, students will add and subtract decimal fractions and common fractions with common denominators. They will also understand how and when it is appropriate to use rounding. Students will use common measurement units to determine weight. Students will develop their understanding of measuring angles with appropriate units and tools. Students will understand the characteristics of geometric plane and solid figures. They will also use tables, graphs, and charts to record and analyze data.

Instruction and assessment should include the use of manipulatives and appropriate technology. Topics should be represented in multiple ways including concrete/pictorial, verbal/written, numeric/data-based, graphical, and symbolic. Concepts should be introduced and used in the context of real world phenomena.

Concepts / Skills to Maintain

Multiplication and Division of whole numbers
Area
Perimeter
Place Value
Length
Elapsed Time

NUMBER AND OPERATIONS

Students will further develop their understanding of whole numbers and master the four basic operations with whole numbers by solving problems. They will also understand rounding and when to use it appropriately. Students will further develop their understanding of addition and subtraction of decimal fractions and common fractions with like denominators.

M4N1. Students will further develop their understanding of how whole numbers and decimals are represented in the base-ten numeration system.

- a. Identify place value names and places from hundredths through one million.
- b. Equate a number's word name, its standard form, and its expanded form.

M4N2. Students will understand and apply the concept of rounding numbers.

- a. Round numbers to the nearest ten, hundred, or thousand.
- b. Describe situations in which rounding numbers would be appropriate and determine whether to round to the nearest ten, hundred, or thousand.
- c. Determine to which whole number or tenth a given decimal is closest using tools such as a number line, and/or charts.
- d. Round a decimal to the nearest whole number or tenth.
- e. Represent the results of computation as a rounded number when appropriate and estimate a sum or difference by rounding numbers.

3-5 Mathematics Georgia Performance Standards

Grade 4

M4N3. Students will solve problems involving multiplication of 2-3 digit numbers by 1 or 2 digit numbers.

M4N4. Students will further develop their understanding of division of whole numbers and divide in problem solving situations without calculators.

- a. Know the division facts with understanding and fluency.
- b. Solve problems involving division by 1 or 2-digit numbers (including those that generate a remainder).
- c. Understand the relationship between dividend, divisor, quotient, and remainder.
- d. Understand and explain the effect on the quotient of multiplying or dividing both the divisor and dividend by the same number. ($2050 \div 50$ yields the same answer as $205 \div 5$).

M4N5. Students will further develop their understanding of the meaning of decimals and use them in computations.

- a. Understand decimals are a part of the base-ten system.
- b. Understand the relative size of numbers and order two digit decimals.
- c. Add and subtract both one and two digit decimals.
- d. Model multiplication and division of decimals by whole numbers.
- e. Multiply and divide both one and two digit decimals by whole numbers.

M4N6. Students will further develop their understanding of the meaning of decimal fractions and common fractions and use them in computations.

- a. Understand representations of equivalent common fractions and/or decimal fractions.
- b. Add and subtract fractions and mixed numbers with like denominators. (Denominators should not exceed twelve.)
- c. Use mixed numbers and improper fractions interchangeably.

M4N7. Students will explain and use properties of the four arithmetic operations to solve and check problems.

- a. Describe situations in which the four operations may be used and the relationships among them.
- b. Compute using the order of operations, including parentheses.
- c. Compute using the commutative, associative, and distributive properties.
- d. Use mental math and estimation strategies to compute.

3-5 Mathematics Georgia Performance Standards

Grade 4

MEASUREMENT

Students will measure weight in appropriate metric and standard units. They will also measure angles.

M4M1. Students will understand the concept of weight and how to measure weight.

- a. Use standard and metric units to measure the weight of objects.
- b. Know units used to measure weight (gram, kilogram, ounces, pounds, and tons).
- c. Compare one unit to another within a single system of measurement.

M4M2. Students will understand the concept of angles and how to measure them.

- a. Use tools, such as a protractor or angle ruler, and other methods such as paper folding, drawing a diagonal in a square, to measure angles.
- b. Understand the meaning and measure of a half rotation (180°) and a full rotation (360°).
- c. Determine that the sum of the three angles of a triangle is always 180° .

GEOMETRY

Students will understand and build plane and solid geometric figures. They will also graph points on the coordinate plane.

M4G1. Students will define and identify the characteristics of geometric figures through examination and construction.

- a. Examine and compare angles in order to classify and identify triangles by their angles.
- b. Describe parallel and perpendicular lines in plane geometric figures.
- c. Examine and classify quadrilaterals (including parallelograms, squares, rectangles, trapezoids, and rhombi) by their properties.
- d. Compare and contrast the relationships among quadrilaterals.

M4G2. Students will understand fundamental solid figures.

- a. Compare and contrast a cube and a rectangular prism in terms of the number and shape of their faces, edges, and vertices.
- b. Describe parallel and perpendicular lines and planes in connection with the rectangular prism.
- c. Build/collect models for solid geometric figures (cubes, prisms, cylinders, pyramids, spheres, and cones) using nets and other representations.

M4G3. Students will use the coordinate system.

- a. Understand and apply ordered pairs in the first quadrant of the coordinate system.
- b. Locate a point in the first quadrant in the coordinate plane and name the ordered pair.
- c. Graph ordered pairs in the first quadrant.

3-5 Mathematics Georgia Performance Standards ***Grade 4***

ALGEBRA

Students will investigate and represent mathematical relationships between quantities using mathematical expressions in problem-solving situations.

M4A1. Students will represent and interpret mathematical relationships in quantitative expressions.

- a. Understand and apply patterns and rules to describe relationships and solve problems.
- b. Represent unknowns using symbols, such as \square and Δ .
- c. Write and evaluate mathematical expressions using symbols and different values.

DATA ANALYSIS AND PROBABILITY

Students will gather, organize, and display data. They will also compare features of graphs.

M4D1. Students will gather, organize, and display data according to the situation and compare related features.

- a. Construct and interpret line graphs, line plot graphs, pictographs, Venn diagrams, and bar graphs.
- b. Investigate the features and tendencies of graphs.
- c. Compare different graphical representations for a given set of data.
- d. Identify missing information and duplications in data.
- e. Determine and justify the range, mode, and median of a set of data.

Process Skills

Each topic studied in this course should be developed with careful thought toward helping every student achieve the following process standards.

M4P1. Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

M4P2. Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

3-5 Mathematics Georgia Performance Standards ***Grade 4***

M4P3. Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

M4P4. Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

M4P5. Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

The following terms and symbols are often misunderstood. These concepts are not an inclusive list and should not be taught in isolation. However, due to evidence of frequent difficulty and misunderstanding associated with these concepts, instructors should pay particular attention to them and how their students are able to explain and apply them.

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Terms / Symbols:

mixed fraction, proper fraction, improper fraction, point, ray, line, line segment, parallel, perpendicular, diagonal line, plane, weight, ounce, pound, ton, gram, kilogram, protractor, degree, rotation, parallelogram, trapezoid, rhombus, rectangular prism, pyramid, coordinate system, ordered pair, line graph, right triangle, acute triangle, obtuse triangle, net, median, mode, range, straight angle

3-5 Mathematics Georgia Performance Standards Grade 5

By the end of grade five, students will further develop their understanding of multiplication and division of whole numbers, decimals, and fractions. They will also understand and investigate algebraic mathematical expressions. Students will also expand their understanding of computing area and volume of simple geometric figures. Students will understand the meaning of congruent geometric shapes and the relationship of the circumference of a circle to its diameter. They will also use percentages and circle graphs to interpret statistical data.

Instruction and assessment should include the use of manipulatives and appropriate technology. Topics should be represented in multiple ways including concrete/pictorial, verbal/written, numeric/data-based, graphical, and symbolic. Concepts should be introduced and used in the context of real world phenomena.

Concepts / Skills to Maintain

Add and subtract decimals

Whole numbers and decimals computation

Angle measurement

Length, area, and weight

Number sense

Add and subtract common fractions with like denominators

Data usage and representation

Characteristics of 2-D and 3-D shapes

Order of Operations

Properties of addition and multiplication

NUMBER AND OPERATIONS

Students will further develop their understanding of the concept of whole numbers. They will also understand the meanings of multiplication and division of decimals and use decimals and common fractions in computation, as well as in problem solving situations.

M5N1. Students will further develop their understanding of whole numbers.

- a. Classify the set of counting numbers into subsets with distinguishing characteristics (odd/even, prime/composite).
- b. Find multiples and factors.
- c. Analyze and use divisibility rules.

3-5 Mathematics Georgia Performance Standards

Grade 5

M5N2. Students will further develop their understanding of decimals as part of the base-ten number system.

- a. Understand place value.
- b. Analyze the effect on the product when a number is multiplied by 10, 100, 1000, 0.1, 0.01, and .001.
- c. Use $<$, $>$, or $=$ to compare decimals and justify the comparison.

M5N3. Students will further develop their understanding of the meaning of multiplication and division with decimals and use them.

- a. Model multiplication and division of decimals.
- b. Explain the process of multiplication and division, including situations in which the multiplier and divisor are both whole numbers and decimals.
- c. Multiply and divide with decimals including decimals less than one and greater than one.
- d. Understand the relationships and rules for multiplication and division of whole numbers also apply to decimals.

M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.

- a. Understand division of whole numbers can be represented as a fraction ($a/b = a \div b$).
- b. Understand the value of a fraction is not changed when both its numerator and denominator are multiplied or divided by the same number because it is the same as multiplying or dividing by one.
- c. Find equivalent fractions and simplify fractions.
- d. Model the multiplication and division of common fractions.
- e. Explore finding common denominators using concrete, pictorial, and computational models.
- f. Use $<$, $>$, or $=$ to compare fractions and justify the comparison.
- g. Add and subtract common fractions and mixed numbers with unlike denominators.
- h. Use fractions (proper and improper) and decimals interchangeably.
- i. Estimate products and quotients.

M5N5. Students will understand the meaning of percentage.

- a. Explore and model percents using multiple representations.
- b. Apply percents to circle graphs.

3-5 Mathematics Georgia Performance Standards

Grade 5

MEASUREMENT

Students will compute the area of geometric plane figures. They will also understand the concept of volume and compute the volume of simple geometric solids and measure capacity. Students will convert from one unit to another within one system of measurement.

M5M1. Students will extend their understanding of area of geometric plane figures.

- a. Estimate the area of geometric plane figures.
- b. Derive the formula for the area of a parallelogram.
- c. Derive the formula for the area of a triangle.
- d. Find the areas of triangles and parallelograms using formulae.
- e. Estimate the area of a circle through partitioning and tiling.
- f. Find the area of a polygon (regular and irregular) by dividing it into squares, rectangles, and/or triangles and find the sum of the areas of those shapes.
- g. Derive the formula for the area of a circle.
- h. Find the area of a circle using the formula and $\pi \approx 3.14$.

M5M2. Students will extend their understanding of perimeter to include circumference.

- a. Derive the formula for the circumference of a circle.
- b. Find the circumference of a circle using the formula and $\pi \approx 3.14$.

M5M3. Students will measure capacity with appropriately chosen units and tools.

- a. Use milliliters, liters, fluid ounces, cups, pints, quarts, and gallons to measure capacity.
- b. Compare one unit to another within a single system of measurement.

M5M4. Students will understand and compute the volume of a simple geometric solid.

- a. Understand a cubic unit (u^3) is represented by a cube in which each edge has the length of 1 unit.
- b. Identify the units used in computing volume as cubic centimeters (cm^3), cubic meters (m^3), cubic inches (in^3), cubic feet (ft^3), and cubic yards (yd^3).
- c. Derive the formula for finding the volume of a cube and a rectangular prism using manipulatives.
- d. Compute the volume of a cube and a rectangular prism using formulae.
- e. Estimate the volume of a simple geometric solid.
- f. Understand the similarities and differences between volume and capacity.

3-5 Mathematics Georgia Performance Standards ***Grade 5***

GEOMETRY

Students will further develop their understanding of geometric figures.

M5G1. Students will understand congruence of geometric figures and the correspondence of their vertices, sides, and angles.

M5G2. Students will understand the relationship of the circumference of a circle to its diameter is pi ($\pi \approx 3.14$).

ALGEBRA

Students will represent and investigate mathematical expressions algebraically by using variables.

M5A1. Students will represent and interpret the relationships between quantities algebraically.

- a. Use variables, such as n or x , for unknown quantities in algebraic expressions.
- b. Investigate simple algebraic expressions by substituting numbers for the unknown.
- c. Determine that a formula will be reliable regardless of the type of number (whole numbers or decimals) substituted for the variable.

DATA ANALYSIS AND PROBABILITY

Students will gather, organize, and display data and interpret graphs.

M5D1. Students will analyze graphs.

- a. Analyze data presented in a graph.
- b. Compare and contrast multiple graphic representations (circle graphs, line graphs, line plot graphs, pictographs, Venn diagrams, and bar graphs) for a single set of data and discuss the advantages/disadvantages of each.
- c. Determine and justify the mean, range, mode, and median of a set of data.

M5D2. Students will collect, organize, and display data using the most appropriate graph.

Process Skills

Each topic studied in this course should be developed with careful thought toward helping every student achieve the following process standards.

M5P1. Students will solve problems (using appropriate technology).

- a. Build new mathematical knowledge through problem solving.
- b. Solve problems that arise in mathematics and in other contexts.
- c. Apply and adapt a variety of appropriate strategies to solve problems.
- d. Monitor and reflect on the process of mathematical problem solving.

3-5 Mathematics Georgia Performance Standards

Grade 5

M5P2. Students will reason and evaluate mathematical arguments.

- a. Recognize reasoning and proof as fundamental aspects of mathematics.
- b. Make and investigate mathematical conjectures.
- c. Develop and evaluate mathematical arguments and proofs.
- d. Select and use various types of reasoning and methods of proof.

M5P3. Students will communicate mathematically.

- a. Organize and consolidate their mathematical thinking through communication.
- b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.
- c. Analyze and evaluate the mathematical thinking and strategies of others.
- d. Use the language of mathematics to express mathematical ideas precisely.

M5P4. Students will make connections among mathematical ideas and to other disciplines.

- a. Recognize and use connections among mathematical ideas.
- b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.
- c. Recognize and apply mathematics in contexts outside of mathematics.

M5P5. Students will represent mathematics in multiple ways.

- a. Create and use representations to organize, record, and communicate mathematical ideas.
- b. Select, apply, and translate among mathematical representations to solve problems.
- c. Use representations to model and interpret physical, social, and mathematical phenomena.

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Terms / Symbols:

simplify, common denominator, congruence, %, percent, improper fraction, divisibility, multiple, factor, estimate, volume, tiling, irregular polygon, polygon, capacity, circumference, pi, circle graph, cup, pint, quart, gallon, milliliter, liter, mean, \approx , \cong , π