

Training for the New Georgia Performance Standard

Day 1: Standards, Content, and
Curriculum Mapping

**Content Participant's Guide
Mathematics Grades 3 - 5**

Use of This Guide

This training program was developed by the Georgia Department of Education as part of a series of professional opportunities to help teachers increase student achievement through the use of the Georgia Performance Standards.

The module materials, including a Content Facilitator's Guide, Participant's Guide, and PowerPoint Presentation are available on CD designated trainers throughout the state of Georgia who have successfully completed a Train-the-Trainer course offered through the Georgia Department of Education. These trainers have also received supplementary materials.

Materials (guides, presentations, etc.) will be available electronically on <http://www.georgiastandards.org> under the training tab after all trainings of Day 1 have occurred. Consult the trainer for other availability.

For more information on this or other GPS training, contact Claire Pierce at (404)657-7063 cpierce@doe.k12.ga.us or Carmen Smith at (404)463-1746 csmith@doe.k12.ga.us.

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Agenda

This is a one-day course, with approximately seven hours of instructional time.

Introduction

Overview of the Standards

Standards-Based Teaching and Learning

Putting It All Together

Summary and Field Assignments

Training Goal

Demonstrate a deep understanding of the new Georgia Performance Standards and the standards-based education approach, through curriculum mapping, development of formative and summative assessments, classroom implementation, differentiation, and the design of instruction matched to the standards and research-based best practices for enrichment and extension through collaboration and teamwork.

Key words from the goal:

- Deep understanding
- Georgia Performance Standards (GPS)
- Curriculum Mapping
- Assessments
- Implementation
- Differentiation
- Instruction

Note that the goal will not be reached by day one of training alone. It will take preparation, seven days of classroom instruction, and follow-up to master this goal. Various days of training will deal with different components of the goal, such as curriculum mapping, assessment, instruction, and differentiation.

Module Objectives

By the end of day one of training, participants will be able to:

1. Understand the benefits of the GPS.
2. Know the various phases of the GPS rollout plan.
3. Define terms related to the GPS.
4. Identify four parts of each standard.
5. Develop and use a curriculum map.
6. Cultivate a strong awareness of standards-based teaching and learning.
7. Become familiar with 3 – 5 mathematics GPS along with the expected depth and rigor.
8. Be aware of various support venues available throughout the state of Georgia that will assist with implementation.
9. Have a deeper understanding of the content addressed within the module.

3-5 Mathematics GPS

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.

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 and time
Geometric shapes
Money
Area models (arrays) of multiplication

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M3N. 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 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.

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.

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.
- 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.

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

- a. Understand a decimal fraction (i.e., 0.1) and a common fraction (i.e., $1/10$) represent parts of a whole.
- b. Understand the fraction a/b represents a equal sized parts of a whole that is divided into b equal sized parts.
- c. Understand a one place decimal fraction represents tenths, i.e., $0.3 = 3/10$.
- 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.
- g. Solve problems involving fractions.

M3M. 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 simple geometric figures (squares and rectangles).

- Understand the meaning of the linear unit and measurement in perimeter.
- Understand the concept of perimeter as being the boundary of a simple geometric figure.
- Determine the perimeter of a simple 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).

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

M3G. 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.

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

M3A. 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.

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

M3D. Data Analysis

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 bar graphs and tables.
- b. Construct and interpret bar graphs using scale increments of 1, 2, 5, and 10.

M3P. 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.

Terms / Symbols:

whole number, , decimal point, place value of 1/10 (tenth), numerator, denominator, second, sign of equality, sign of inequality, \div , \times , decimal fraction, common fraction, elapsed time, scalene triangle, isosceles triangle, equilateral triangle, bar graph, mile, kilometer

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

Addition and subtraction of decimals
Multiplication and Division of whole numbers
Area
Perimeter
Place Value
Weight and Length

M4N. 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 appropriately use it. Students will add and subtract decimal fractions and common fractions with common denominators.

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M4N1. Students will further develop their understanding of how whole numbers 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. Understand the meaning of rounding a decimal fraction to the nearest whole number.
- d. Represent the results of computation as a rounded number when appropriate and estimate a sum or difference by rounding numbers.

M4N3. Students will solve problems involving multiplication of 2-3 digit numbers by 1-2 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 a 2-digit number (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 decimal fractions and use them in computations.

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

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

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- a. Understand representations of simple equivalent fractions.
- b. Add and subtract fractions and mixed numbers with common denominators.
(Denominators should not exceed twelve.)
- c. Convert and 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.

M4M. 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 it.

- 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 it.

- 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°).

M4G. Geometry

Students will understand and construct 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).
- 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. Construct/collect models for solid geometric figures (cube, prisms, cylinder, etc.).

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.

M4A. 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.

M4D. Data Analysis**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. Represent data in bar, line and pictographs.
- 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.

M4P. 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.

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.

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Terms / Symbols:

sum, difference, product, quotient, 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, quadrilateral, congruent, cube, rectangular prism, coordinate system, ordered pair, ratio, proportion, variable, line graph, pictograph

Grade 5

By the end of grade five, students will further develop their understanding of multiplication and division of whole numbers and decimal 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 decimal fractions
Whole numbers and decimal fraction computation
Angle measurement
Length, area, and weight
Number sense
Add and subtract common fractions with like denominators
Data usage and representation
Characteristics of 2D and 3D shapes
Order of Operations

M5N. 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 decimal fractions and use decimal fractions 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.

M5N2. Students will further develop their understanding of decimal fractions 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, and 0.01.

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

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

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 decimal fractions interchangeably.
- i. Estimate products and quotients.

M5N5. Students will understand the meaning of percentage.

- a. Model percent on 10 by 10 grids.
- b. Apply percentage to circle graphs.

M5M. 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 fundamental geometric plane figures.

- a. Estimate the area of fundamental geometric plane figures.
- b. Derive the formula for the area of a parallelogram (e.g., cut the parallelogram apart and rearrange it into a rectangle of the same area).
- c. Derive the formula for the area of a triangle (e.g. demonstrate and explain its relationship to the area of a rectangle with the same base and height).
- d. Find the areas of triangles and parallelograms using formulae.
- e. Estimate the area of a circle through partitioning and tiling and then with formula (let $\pi = 3.14$). (Discuss square units as they apply to circles.)
- 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.

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 (e.g., 1 quart = 2 pints).

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.

M5G. 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 ($\pi \approx 3.14$).

M5A. 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 decimal fractions) substituted for the variable.

M5D. Data Analysis

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, bar graphs, etc.) for a single set of data and discuss the advantages/disadvantages of each.

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

M5P. 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.

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.

Terms / Symbols:

simplify, common denominator, greatest common factor, least common multiple, congruence, %, percent, improper fraction, divisibility, multiple, factor, estimate, volume, tiling, irregular polygon, polygon, capacity, circumference, diameter, pi, circle graph, cup, pint, quart, gallon

3 - 5 Mathematics at a Glance

	Third Grade	Fourth Grade	Fifth Grade
Numbers and Operations	<ul style="list-style-type: none"> • Place Value tenths to then-thousandths • Application of addition, subtraction • Multiplication concepts 2-3 digit by 1-digit • Concepts of Division 2-3 digit by 1-digit whole numbers • Basic concepts of Decimal Fractions and Common Fractions 	<ul style="list-style-type: none"> • Place Value hundredths to one million • Rounding to nearest 10,000 or 1,000 • Multiplication concepts 2-3 digits by 1-2 digits • Multi-Digit Division by 2-digit whole number • Compute with 2-digit decimal fractions • Add,/Subtract common fractions with common denominators • Order of Operations • Properties 	<ul style="list-style-type: none"> • Multiples, Factors, Divisibility • Place Value • Compute (+, -, \square, $\sqrt{\quad}$) with and apply decimal fractions less than one and greater than one • Compute and estimate Fractions with unlike denominators • Meaning of Percentage
Measurement	<ul style="list-style-type: none"> • Elapsed Time (full, half, quarter hour) • Length to nearest $\frac{1}{2}$, $\frac{1}{4}$ inch and mm • Area and Perimeter of squares and rectangles 	<ul style="list-style-type: none"> • Weight and Mass • Angle Concepts and Measurement 	<ul style="list-style-type: none"> • Concepts / Computation / Estimation of Area • Capacity • Concepts and Measurement of Volume of Cube and Rectangular Prism
Geometry	<ul style="list-style-type: none"> • Application of Geometric Figures • Angle relationships • Concepts of Circles 	<ul style="list-style-type: none"> • Classification of Geometric Figures • Models of 3-D Figures • Coordinate System 	<ul style="list-style-type: none"> • Meaning of Congruence • Circumference
Algebra	<ul style="list-style-type: none"> • Using Mathematical Expressions to Represent Relationships 	<ul style="list-style-type: none"> • Interpret Mathematical Relationships in Quantitative Expressions • Collecting, Organizing, and Displaying Data 	<ul style="list-style-type: none"> • Algebraic Representation using variables • Organize, Display, and Analyze Data, Choose Appropriate Graphs
Data Analysis and Probability	<ul style="list-style-type: none"> • Creating and Interpreting Tables and Graphs 		
Process Skills	Problem Solving, Arguments, Language of Mathematics, Interconnectivity, Communication	Problem Solving, Arguments, Language of Mathematics, Interconnectivity, Communication	Problem Solving, Arguments, Language of Mathematics, Interconnectivity, Communication

 **Phase-in Plan**

Grade	Math Training	Math Teaching
K	05-06	06-07
1	05-06	06-07
2	05-06	06-07
3	06-07	07-08
4	06-07	07-08
5	06-07	07-08
6	04-05	05-06
7	05-06	06-07
8	06-07	07-08

Assignment

- **Review the Mathematics Georgia Performance Standards for the grade that you teach.**
- **Think about what evidence is necessary to assess them? How good is good enough?**
- **Bring your GPS Training notebook with you to the Day 2 Training.**



Glossary

CONTENT STANDARDS:	Content standards state the purpose and direction the content is to take, and are generally followed by elements. Content standards define what students are expected to know, understand, and be able to do.
CURRICULUM DOCUMENT:	The Georgia Performance Standards document is the curriculum document that contains all standards that should be learned by all students.
ELEMENTS:	Elements are part of the content standards that identify specific learning goals associated with the standard.
PERFORMANCE STANDARDS:	Performance standards define specific expectations of what students should know and be able to do and how well students must perform to achieve or exceed the standard. Georgia's performance standards are composed of four components: content standards, tasks, student work, and teacher commentary.
PROCESS STANDARDS:	Process standards define the means used to develop patterns of thought and behavior that lead to conceptual understanding.
STANDARD:	Something set up and established by authority as a rule for the measure of quantity, weight, extent, value, or quality.
STANDARDS-BASED EDUCATION:	In standards-based classrooms, standards are the starting point for classroom instruction that ensures high expectations for all students.
STRAND:	A strand is an organizing tool used to group standards by content. For example, the English language arts curriculum contains strands of reading, writing, listening, speaking, and viewing. K-5 science curriculum contains a life science strand, physical science strand, and an earth science strand.
STUDENT WORK:	Examples of successful student work are included to specify what it takes to meet the standard and to enable both teachers and students to see what meeting the standard "looks like."
TASKS:	Keyed to the relevant standards, tasks provide a sample performance that demonstrates to teachers what students should know and be able to do during or by the end of the course. Some

tasks can serve as activities that will help students achieve the learning goals of the standard, while others can be used to assess student learning; many serve both purposes. Although the Georgia Performance Standards include tasks, teachers may develop their own tasks.

TEACHER COMMENTARY: Teacher commentary is meant to open the pathways of communication between students and the classroom teacher as well as within faculty in order to ensure consistency within assessment and expectations. Commentary shows students why they did or did not meet a standard and enables them to take ownership of their own learning.

Selected Terms/Symbols

Bar Graph	A graph in which quantities are represented by bars.
Cone	A three-dimensional figure with a circular base and vertex.
Cylinder	A three-dimensional figure with two parallel and congruent curves (usually circles) as bases, which are joined by a curved surface.
Decompose	To break a number up into other numbers.
Geometric Figure	A shape formed by a combination of points, lines, curves, or surfaces.
Geometric Solid	A three- dimensional shape or object, such as a sphere or a cube.
Line Symmetry	A figure that can be folded along a line so that the two halves match exactly has line symmetry.
Multiple	The product of a whole number and any whole number. A multiple of 16 is 64 ($4 \times 16 = 64$).
Net	A two- dimensional shape that can be folded into a three- dimensional figure is a net of that figure.
Non-Routine Problem	A word problem that requires a variety of strategies in order to solve.
Pictograph	A graph that uses pictures or symbols to represent data.

Rotational Symmetry	A geometrical transformation in which a figure is moved rigidly around a fixed point. Some figures are unchanged by certain rotations.
Venn Diagram	A picture that illustrates the relationships between two or more sets.

Provided Texts

Mathematics resources that are ordered to be distributed during the 3 – 5 mathematics training this year are listed below.

Benjamin, Amy. *Differentiated Instruction: A Guide for Elementary Teachers*. Larchmont, NY: Eye on Education, Incorporated. 2003

Cavanagh, Mary C. *Math to Know*. Wilmington, MA: Great Source, Houghton Mifflin. 2004

Cavanagh, Mary C. *Math to Learn*. Wilmington, MA: Great Source, Houghton Mifflin. 2004

Van de Walle, John and Lou Ann Lovin. *Teaching Student-Centered Mathematics, Grades 3 – 5*. New York, NY: Longman Press. 2004

Each school received one copy of each book listed below at the beginning of the previous school year. This box of books was addressed to the principal of the school.

Hayes Jacobs, Heidi. *Mapping the Big Pictures: Integrating Curriculum and Assessment K-12*. Alexandria, VA: Association for Supervision and Curriculum Development. 1997.

Marzano, Robert J. *Transforming Classroom Grading*. Alexandria, VA: Association for Supervision and Curriculum Development. 2000.

Marzano, Robert J. *What Works in Schools: Translating Research into Action*. Alexandria, VA: Association for Supervision and Curriculum Development. 2003.

Marzano, Robert J., Debra Pickering, and Jay McTighe. *Assessing Student Outcomes: Performance Assessment Using the Dimensions of Learning Model*. Alexandria, VA: Association for Supervision and Curriculum Development. 1993.

Marzano, Robert J, Debra Pickering, and Jane E. Pollock. *Classroom Instruction That Works: Research-Based Strategies for Increasing Student Achievement*. Alexandria, VA: Association for Supervision and Curriculum Development. 2001.

Marzano, Robert J, Jana Marzano, & Debra Pickering. *Classroom Management That Works: Research-Based Strategies for Every Teacher*. Alexandria, VA: Association for Supervision and Curriculum Development. 2003.

Strong, Richard W., Harvey F. Silver, and Matthew J. Perini. *Teaching What Matters Most: Standards and Strategies for Raising Student Achievement*. Alexandria, VA: Association for Supervision and Curriculum Development. 2001.

Tomlinson, Carol Ann. *How to Differentiate Instruction in Mixed-Ability Classrooms, 2nd edition*. Alexandria, VA: Association for Supervision and Curriculum Development. 2001.

Wiggins, Grant and Jay McTighe. *Understanding by Design*. Alexandria, VA: Association for Supervision and Curriculum Development. 1998.

Wiggins, Grant and Jay McTighe. *Understanding by Design Study Guide*. Alexandria, VA: Association for Supervision and Curriculum Development. 2000.

Web Sites

Illuminations—<http://illuminations.nctm.org/index.asp>

National Library of Virtual Manipulatives— <http://nlvm.usu.edu/en/nav/vlibrary.html>

Units (incorporating Learning Focused components). Connected Learning—<http://www.title3.org/>
BOCES is a cooperative service organization that helps school districts save money by pooling resources and sharing costs.

Special Education Resources

Access, Participation, & Progress in the General K-12 Curriculum. National Center on Accessing the General Curriculum (ncaog.org).

Approximately K-20 general and special educators and parents attended the National Capacity Building Institute on Access, Participation, and Progress in the General Curriculum, held on July 10, in Arlington, VA. The article includes the proceedings from the Institute.

Aligning Special Education with NCLB. www.idonline.org.

The No Child Left Behind Act (NCLB) is a standards-based reform movement. This movement emphasizes standards and the alignment of curriculum and assessment to those standards. States established what is to be taught. The goal of standards is to increase academic achievement levels. A related goal is to close the achievement gap for students who have traditionally been at-risk for academic failure or lack of success. This group includes students with disabilities.

Thompson, S., Thurlow, M., Quenemoen, R.F., & Esler, A. (2001). *Addressing Standards and Assessments on State IEP Forms*, National Center on Educational Outcomes (NCEO Synthesis Report 38)

This article summarizes data on each State's use of standards in developing Individualized Education Programs (IEP) for students with disabilities. All fifty states were asked to send

their IEP forms and to indicate whether the forms were required, recommended, or simply sample forms. Out of the 41 states with IEP forms, only 5 states specifically addressed the general curriculum on their forms. Recommendations for IEP forms that provide decision-making guidance involving access to the general curriculum are summarized.

Writing Standards-based IEPs. Colorado Department of Education. www.cde.org.

The Colorado Department of Education provides information for teachers on developing standards-driven IEPs. The summary includes a definition of standards-driven IEPs, characteristics of standards-driven IEPs, and a rationale for standards-driven IEPs.

Resources for Differentiation

Association for Supervision and Curriculum Development. *At Work in the Differentiated Classroom.* Alexandria, VA. Author. (video staff development set). 2001.

Chapman C. & Gregory, G. *Differentiated Instruction Strategies for Writing in the Content Areas.* Thousand Oaks, CA: Corwin Press. 2003.

Coil, C. *Standards-Based Activities and Assessments for the Differentiated Classroom.* Marion, IL: Pieces of Learning. 2004.

Tomlinson, C. *Fulfilling the Promise of the Differentiated Classroom: Strategies and Tools for Responsive Teaching.* Alexandria, VA: Association for Supervision and Curriculum Development. 2003.

Winebrenner, S. *Teaching Gifted Kids in the Regular Classroom.* Minneapolis, MN: Free Spirit. 1992.

Resources for Mathematics

Andrews, A. G., Trafton, P.R. *Little kids-powerful problem solvers: math stories from a kindergarten classroom.* Portsmouth, NH: Heinemann. 2002.

Burns, M. *About teaching mathematics: a K-8 resource.* Sausalito, CA: Math Solutions Publications. 2000.

Carpenter, T. P., Franke, M. L., Levi, L. *Thinking mathematically: integrating arithmetic and algebra in elementary school.* Portsmouth, NH: Heinemann. 2003.

Kallik, B., Brewer, R. *How to assess problem-solving skills in mathematics.* New York, NY: Scholastic Professional Books. 1997.

Sullivan, P., Lilburn, P. *Good questions for math teaching: why ask them and what to ask (K-6).* Sausalito, CA: Math Solutions Publications. 2002.

Van de Walle, J. A. *Elementary and middle school mathematics: teaching developmentally, fifth edition.* New York, NY: Longman Press. 2004.

<p>M3N1. Students will further develop their understanding of whole numbers and ways of representing them. a. Identify place values from tenths through ten thousands.</p>	<p>M3N1. Students will further develop their understanding of whole numbers and ways of representing them. 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.</p>	<p>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 result of computation.</p>
<p>M3N2. Students will further develop their skills of addition and subtraction and apply them in problem solving. b. Use mental math and estimation strategies to add and subtract.</p>	<p>M3N2. Students will further develop their skills of addition and subtraction and apply them in problem solving. c. Solve problems requiring addition and subtraction.</p>	<p>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.</p>
<p>M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving. b. Know the multiplication facts with understanding and fluency to 10 x 10.</p>	<p>M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving. 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.</p>	<p>M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving. d. Understand the effect on the product when multiplying by multiples of 10.</p>

<p>M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving.</p> <p>e. Apply the identity, commutative and associative properties of multiplication and verify the results.</p>	<p>M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving.</p> <p>f. Use mental math and estimation strategies to multiply.</p>	<p>M3N3. Students will further develop their understanding of multiplication of whole numbers and develop the ability to apply it in problem solving.</p> <p>g. Solve problems requiring multiplication.</p>
<p>M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.</p> <p>a. Understand the relationship between division and multiplication and between division and subtraction.</p> <p>f. Solve problems requiring division.</p>	<p>M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.</p> <p>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.</p>	<p>M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.</p> <p>c. Recognize problem-solving situations in which division may be applied and write corresponding mathematical expressions</p>
<p>M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.</p> <p>d. Explain the meaning of a remainder in division in different circumstances.</p>	<p>M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.</p> <p>e. Divide a 2 and 3-digit number by a 1-digit divisor.</p>	<p>M3N4. Students will understand the meaning of division and develop the ability to apply it in problem solving.</p> <p>f. Solve problems requiring division.</p>

<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>a. Understand a decimal fraction (i.e., 0.1) and a common fraction (i.e., 1/10) represent parts of a whole.</p>	<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>b. Understand the fraction a/b represents a equal sized parts of a whole that is divided into b equal sized parts.</p>	<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>c. Understand a one place decimal fraction represents tenths, i.e., $0.3 = 3/10$.</p>
<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>d. Know and use decimal fractions and common fractions to represent the size of parts created by equal divisions of a whole.</p>	<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>e. Understand the concept of addition and subtraction of decimal fractions and common fractions with like denominators.</p>	<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>f. Model addition and subtraction of decimal fractions and common fractions</p>
<p>M3N5. Students will understand the meaning of decimal fractions and common fractions in simple cases and apply them in problem-solving situations.</p> <p>g. Solve problems involving fractions.</p>	<p>M3M1. Students will further develop their understanding of the concept of time by determining elapsed time of a full, half and quarter-hour.</p>	<p>M3M2. Students will measure length choosing appropriate units and tools.</p> <p>a. Use the units kilometer (km) and mile (mi.) to discuss the measure of long distances.</p>
<p>M3M2. Students will measure length choosing appropriate units and tools.</p> <p>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.</p>	<p>M3M2. Students will measure length choosing appropriate units and tools.</p> <p>c. Estimate length and represent it using appropriate units.</p>	<p>M3M2. Students will measure length choosing appropriate units and tools.</p> <p>d. Compare one unit to another within a single system of measurement.</p>

<p>M3M3. Students will understand and measure the perimeter of simple geometric figures (squares and rectangles).</p> <p>a. Understand the meaning of the linear unit and measurement in perimeter.</p>	<p>M3M3. Students will understand and measure the perimeter of simple geometric figures (squares and rectangles).</p> <p>b. Understand the concept of perimeter as being the boundary of a simple geometric figure.</p>	<p>M3M3. Students will understand and measure the perimeter of simple geometric figures (squares and rectangles).</p> <p>c. Determine the perimeter of a simple geometric figure by measuring and summing the lengths of the sides.</p>
<p>M3M4. Students will understand and measure the area of simple geometric figures (squares and rectangles).</p> <p>a. Understand the meaning of the square unit and measurement in area.</p>	<p>M3M4. Students will understand and measure the area of simple geometric figures (squares and rectangles).</p> <p>b. Model (by tiling) the area of a simple geometric figure using square units (square inch, square foot, etc.).</p>	<p>M3M4. Students will understand and measure the area of simple geometric figures (squares and rectangles).</p> <p>c. Determine the area of squares and rectangles by counting, addition, and multiplication with models</p>
<p>M3G1. Students will further develop their understanding of geometric figures by drawing them. They will also state and explain their properties.</p> <p>a. Draw and classify previously learned fundamental geometric figures and scalene, isosceles and equilateral triangles.</p>	<p>M3G1. Students will further develop their understanding of geometric figures by drawing them. They will also state and explain their properties.</p> <p>b. Identify and explain the properties of fundamental geometric figures.</p>	<p>M3G1. Students will further develop their understanding of geometric figures by drawing them. They will also state and explain their properties.</p> <p>c. Examine and compare angles of fundamental geometric figures.</p>
<p>M3G1. Students will further develop their understanding of geometric figures by drawing them. They will also state and explain their properties.</p> <p>d. Identify the center, diameter, and radius of a circle.</p>	<p>M3A1. Students will use mathematical expressions to represent relationships between quantities and interpret given expressions.</p> <p>a. Describe and extend numeric and geometric patterns.</p>	<p>M3A1. Students will use mathematical expressions to represent relationships between quantities and interpret given expressions.</p> <p>b. Describe and explain a quantitative relationship represented by a formula (such as the perimeter of a geometric figure).</p>

<p>M3A1. Students will use mathematical expressions to represent relationships between quantities and interpret given expressions.</p> <p>c. Use a symbol, such as \square and Δ, to represent an unknown and find the value of the unknown in a number sentence.</p>	<p>M3D1. Students will create and interpret simple tables and graphs.</p> <p>a. Solve problems by organizing and displaying data in bar graphs and tables.</p>	<p>M3D1. Students will create and interpret simple tables and graphs.</p> <p>b. Construct and interpret bar graphs using scale increments of 1, 2, 5, and 10.</p>
<p>M3D1. Students will create and interpret simple tables and graphs.</p> <p>c. Develop and evaluate mathematical arguments and proofs.</p>	<p>M3D1. Students will create and interpret simple tables and graphs.</p> <p>d. Select and use various types of reasoning and methods of proof.</p>	<p>M3P1. Students will solve problems (using appropriate technology).</p> <p>a. Build new mathematical knowledge through problem solving.</p>
<p>M3P1. Students will solve problems (using appropriate technology).</p> <p>b. Solve problems that arise in mathematics and in other contexts.</p>	<p>M3P1. Students will solve problems (using appropriate technology).</p> <p>c. Apply and adapt a variety of appropriate strategies to solve problems.</p>	<p>M3P1. Students will solve problems (using appropriate technology).</p> <p>d. Monitor and reflect on the process of mathematical problem solving.</p>
<p>M3P2. Students will reason and evaluate mathematical arguments.</p> <p>a. Recognize reasoning and proof as fundamental aspects of mathematics.</p>	<p>M3P2. Students will reason and evaluate mathematical arguments.</p> <p>b. Make and investigate mathematical conjectures.</p>	<p>M3P2. Students will reason and evaluate mathematical arguments.</p> <p>c. Develop and evaluate mathematical arguments and proofs.</p>
<p>M3P2. Students will reason and evaluate mathematical arguments.</p> <p>d. Select and use various types of reasoning and methods of proof.</p>	<p>M3P3. Students will communicate mathematically.</p> <p>a. Organize and consolidate their mathematical thinking through communication.</p>	<p>M3P3. Students will communicate mathematically.</p> <p>b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others. mathematical ideas precisely.</p>

<p>M3P3. Students will communicate mathematically. c. Analyze and evaluate the mathematical thinking and strategies of others.</p>	<p>M3P3. Students will communicate mathematically. d. Use the language of mathematics to express mathematical ideas precisely.</p>	
<p>M3P4. Students will make connections among mathematical ideas and to other disciplines. a. Recognize and use connections among mathematical ideas.</p>	<p>M3P4. Students will make connections among mathematical ideas and to other disciplines. b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</p>	<p>M3P4. Students will make connections among mathematical ideas and to other disciplines. c. Recognize and apply mathematics in contexts outside of mathematics.</p>
<p>M3P5. Students will represent mathematics in multiple ways. a. Create and use representations to organize, record, and communicate mathematical ideas.</p>	<p>M3P5. Students will represent mathematics in multiple ways. b. Select, apply, and translate among mathematical representations to solve problems.</p>	<p>M3P5. Students will represent mathematics in multiple ways. c. Use representations to model and interpret physical, social, and mathematical phenomena.</p>
<p>M4N1. Students will further develop their understanding of how whole numbers are represented in the base-ten numeration system. a. Identify place value names and places from hundredths through one million.</p>	<p>M4N1. Students will further develop their understanding of how whole numbers are represented in the base-ten numeration system. b. Equate a number's word name, its standard form, and its expanded form.</p>	<p>M4N2. Students will understand and apply the concept of rounding numbers. a. Round numbers to the nearest ten, hundred, or thousand.</p>
<p>M4N2. Students will understand and apply the concept of rounding numbers. b. Describe situations in which rounding numbers would be appropriate and determine whether to round to the nearest ten, hundred, or thousand.</p>	<p>M4N2. Students will understand and apply the concept of rounding numbers. c. Understand the meaning of rounding a decimal fraction to the nearest whole number.</p>	<p>M4N2. Students will understand and apply the concept of rounding numbers. d. Represent the results of computation as a rounded number when appropriate and estimate a sum or difference by rounding numbers.</p>

<p>M4N3. Students will solve problems involving multiplication of 2-3 digit numbers by 1-2 digit numbers.</p>	<p>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.</p>	
<p>M4N4. Students will further develop their understanding of division of whole numbers and divide in problem solving situations without calculators. b. Solve problems involving division by a 2-digit number (including those that generate a remainder).</p>	<p>M4N4. Students will further develop their understanding of division of whole numbers and divide in problem solving situations without calculators. c. Understand the relationship between dividend, divisor, quotient, and remainder.</p>	<p>M4N4. Students will further develop their understanding of division of whole numbers and divide in problem solving situations without calculators. 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 $205 \div 5$).</p>
<p>M4N5. Students will further develop their understanding of the meaning of decimal fractions and use them in computations. a. Understand decimal fractions are a part of the base-ten system.</p>	<p>M4N5. Students will further develop their understanding of the meaning of decimal fractions and use them in computations. b. Understand the relative size of numbers and order two digit decimal fractions.</p>	<p>M4N5. Students will further develop their understanding of the meaning of decimal fractions and use them in computations. c. Add and subtract both one and two digit decimal fractions.</p>
<p>M4N5. Students will further develop their understanding of the meaning of decimal fractions and use them in computations. d. Model multiplication and division of decimal fractions by whole numbers.</p>	<p>M4N5. Students will further develop their understanding of the meaning of decimal fractions and use them in computations. e. Multiply and divide both one and two digit decimal fractions by whole numbers.</p>	<p>M4N6. Students will further develop their understanding of the meaning of common fractions and use them in computations. a. Understand representations of simple equivalent fractions.</p>

<p>M4N6. Students will further develop their understanding of the meaning of common fractions and use them in computations.</p> <p>b. Add and subtract fractions and mixed numbers with common denominators. (Denominators should not exceed twelve.)</p>	<p>M4N6. Students will further develop their understanding of the meaning of common fractions and use them in computations.</p> <p>c. Convert and use mixed numbers and improper fractions interchangeably.</p>	<p>M4N7. Students will explain and use properties of the four arithmetic operations to solve and check problems.</p> <p>a. Describe situations in which the four operations may be used and the relationships among them.</p>
<p>M4N7. Students will explain and use properties of the four arithmetic operations to solve and check problems.</p> <p>b. Compute using the order of operations, including parentheses.</p>	<p>M4N7. Students will explain and use properties of the four arithmetic operations to solve and check problems.</p> <p>c. Compute using the commutative, associative, and distributive properties.</p>	<p>M4N7. Students will explain and use properties of the four arithmetic operations to solve and check problems.</p> <p>d. Use mental math and estimation strategies to compute.</p>
<p>M4M1. Students will understand the concept of weight and how to measure it.</p> <p>a. Use standard and metric units to measure the weight of objects.</p>	<p>M4M1. Students will understand the concept of weight and how to measure it.</p> <p>b. Know units used to measure weight (gram, kilogram, ounces, pounds and tons).</p>	<p>M4M1. Students will understand the concept of weight and how to measure it.</p> <p>c. Compare one unit to another within a single system of measurement.</p>
<p>M4M2. Students will understand the concept of angles and how to measure it.</p> <p>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.</p>	<p>M4M2. Students will understand the concept of angles and how to measure it.</p> <p>b. Understand the meaning and measure of a half rotation (180°) and a full rotation (360°).</p>	<p>M4G1. Students will define and identify the characteristics of geometric figures through examination and construction.</p> <p>a. Examine and compare angles in order to classify and identify triangles by their angles.</p>

<p>M4G1. Students will define and identify the characteristics of geometric figures through examination and construction.</p> <p>b. Describe parallel and perpendicular lines in plane geometric figures.</p>	<p>M4G1. Students will define and identify the characteristics of geometric figures through examination and construction.</p> <p>c. Examine and classify quadrilaterals (including parallelograms, squares, rectangles, trapezoids, and rhombi).</p>	<p>M4G1. Students will define and identify the characteristics of geometric figures through examination and construction.</p> <p>d. Compare and contrast the relationships among quadrilaterals.</p>
<p>M4G2. Students will understand fundamental solid figures.</p> <p>a. Compare and contrast a cube and a rectangular prism in terms of the number and shape of their faces, edges, and vertices.</p>	<p>M4G2. Students will understand fundamental solid figures.</p> <p>b. Describe parallel and perpendicular lines and planes in connection with the rectangular prism.</p>	<p>M4G2. Students will understand fundamental solid figures.</p> <p>c. Construct/collect models for solid geometric figures (cube, prisms, cylinder, etc.).</p>
<p>M4G3. Students will use the coordinate system.</p> <p>a. Understand and apply ordered pairs in the first quadrant of the coordinate system.</p>	<p>M4G3. Students will use the coordinate system.</p> <p>b. Locate a point in the first quadrant in the coordinate plane and name the ordered pair.</p>	<p>M4G3. Students will use the coordinate system.</p> <p>c. Graph ordered pairs in the first quadrant.</p>
<p>M4A1. Students will represent and interpret mathematical relationships in quantitative expressions.</p> <p>a. Understand and apply patterns and rules to describe relationships and solve problems.</p>	<p>M4A1. Students will represent and interpret mathematical relationships in quantitative expressions.</p> <p>b. Represent unknowns using symbols, such as \square and Δ.</p>	<p>M4A1. Students will represent and interpret mathematical relationships in quantitative expressions.</p> <p>c. Write and evaluate mathematical expressions using symbols and different values.</p>
<p>M4D1. Students will gather, organize, and display data according to the situation and compare related features.</p> <p>a. Represent data in bar, line and pictographs.</p>	<p>M4D1. Students will gather, organize, and display data according to the situation and compare related features.</p> <p>b. Investigate the features and tendencies of graphs.</p>	<p>M4D1. Students will gather, organize, and display data according to the situation and compare related features.</p> <p>c. Compare different graphical representations for a given set of data.</p>

<p>M4D1. Students will gather, organize, and display data according to the situation and compare related features. d. Identify missing information and duplications in data.</p>	<p>M4P1. Students will solve problems (using appropriate technology). a. Build new mathematical knowledge through problem solving.</p>	<p>M4P1. Students will solve problems (using appropriate technology). b. Solve problems that arise in mathematics and in other contexts.</p>
<p>M4P1. Students will solve problems (using appropriate technology). c. Apply and adapt a variety of appropriate strategies to solve problems.</p>	<p>M4P1. Students will solve problems (using appropriate technology). d. Monitor and reflect on the process of mathematical problem solving.</p>	<p>M4P2. Students will reason and evaluate mathematical arguments. a. Recognize reasoning and proof as fundamental aspects of mathematics.</p>
<p>M4P2. Students will reason and evaluate mathematical arguments. b. Make and investigate mathematical conjectures.</p>	<p>M4P2. Students will reason and evaluate mathematical arguments. c. Develop and evaluate mathematical arguments and proofs.</p>	<p>M4P2. Students will reason and evaluate mathematical arguments. d. Select and use various types of reasoning and methods of proof.</p>
<p>M4P3. Students will communicate mathematically. a. Organize and consolidate their mathematical thinking through communication.</p>	<p>M4P3. Students will communicate mathematically. b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.</p>	<p>M4P3. Students will communicate mathematically. c. Analyze and evaluate the mathematical thinking and strategies of others.</p>
<p>M4P3. Students will communicate mathematically. d. Use the language of mathematics to express mathematical ideas precisely.</p>	<p>M4P4. Students will make connections among mathematical ideas and to other disciplines. a. Recognize and use connections among mathematical ideas.</p>	<p>M4P4. Students will make connections among mathematical ideas and to other disciplines. b. Understand how mathematical ideas interconnect and build on one another to produce a coherent whole.</p>
<p>M4P4. Students will make connections among mathematical ideas and to other disciplines. c. Recognize and apply mathematics in contexts outside of mathematics.</p>	<p>M4P5. Students will represent mathematics in multiple ways. a. Create and use representations to organize, record, and communicate mathematical ideas.</p>	<p>M4P5. Students will represent mathematics in multiple ways. b. Select, apply, and translate among mathematical representations to solve problems.</p>

<p>M4P5. Students will represent mathematics in multiple ways. c. Use representations to model and interpret physical, social, and mathematical</p>	<p>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).</p>	<p>M5N1. Students will further develop their understanding of whole numbers. b. Find multiples and factors.</p>
<p>M5N1. Students will further develop their understanding of whole numbers. c. Analyze and use divisibility rules.</p>	<p>M5N2. Students will further develop their understanding of decimal fractions as part of the base-ten number system. a. Understand place value.</p>	<p>M5N2. Students will further develop their understanding of decimal fractions as part of the base-ten number system. b. Analyze the effect on the product when a number is multiplied by 10, 100, 1000, 0.1, and 0.01.</p>
<p>M5N3. Students will further develop their understanding of the meaning of multiplication and division with decimal fractions and use them. a. Model multiplication and division of decimal fractions by another decimal fraction.</p>	<p>M5N3. Students will further develop their understanding of the meaning of multiplication and division with decimal fractions and use them. b. Explain the process of multiplication and division, including situations in which the multiplier and divisor are both whole numbers and decimal fractions.</p>	<p>M5N3. Students will further develop their understanding of the meaning of multiplication and division with decimal fractions and use them. c. Multiply and divide with decimal fractions including decimal fractions less than one and greater than one.</p>
<p>M5N3. Students will further develop their understanding of the meaning of multiplication and division with decimal fractions and use them. d. Understand the relationships and rules for multiplication and division of whole numbers also apply to decimal fractions.</p>	<p>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 ($a/b = a \div b$).</p>	

		<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>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.</p>
<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>c. Find equivalent fractions and simplify fractions.</p>	<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>d. Model the multiplication and division of common fractions.</p>	<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>e. Explore finding common denominators using concrete, pictorial, and computational models.</p>
<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>f. Use $<$, $>$, or $=$ to compare fractions and justify the comparison.</p>	<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>g. Add and subtract common fractions and mixed numbers with unlike denominators.</p>	<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>h. Use fractions (proper and improper) and decimal fractions interchangeably.</p>
<p>M5N4. Students will continue to develop their understanding of the meaning of common fractions and compute with them.</p> <p>i. Estimate products and quotients.</p>	<p>M5N5. Students will understand the meaning of percentage.</p> <p>a. Model percent on 10 by 10 grids.</p>	<p>M5N5. Students will understand the meaning of percentage.</p> <p>b. Apply percentage to circle graphs.</p>

<p>M5M1. Students will extend their understanding of area of fundamental geometric plane figures.</p> <p>a. Estimate the area of fundamental geometric plane figures.</p>	<p>M5M1. Students will extend their understanding of area of fundamental geometric plane figures.</p> <p>b. Derive the formula for the area of a parallelogram (e.g., cut the parallelogram apart and rearrange it into a rectangle of the same area).</p>	<p>M5M1. Students will extend their understanding of area of fundamental geometric plane figures.</p> <p>c. Derive the formula for the area of a triangle (e.g. demonstrate and explain its relationship to the area of a rectangle with the same base and height).</p>
<p>M5M1. Students will extend their understanding of area of fundamental geometric plane figures.</p> <p>d. Find the areas of triangles and parallelograms using formulae.</p>	<p>M5M1. Students will extend their understanding of area of fundamental geometric plane figures.</p> <p>e. Estimate the area of a circle through partitioning and tiling and then with formula (let $\pi = 3.14$). (Discuss square units as they apply to circles.)</p>	<p>M5M1. Students will extend their understanding of area of fundamental geometric plane figures.</p> <p>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.</p>
<p>M5M3. Students will measure capacity with appropriately chosen units and tools.</p> <p>a. Use milliliters, liters, fluid ounces, cups, pints, quarts, and gallons to measure capacity.</p>	<p>M5M3. Students will measure capacity with appropriately chosen units and tools.</p> <p>b. Compare one unit to another within a single system of measurement (e.g., 1 quart = 2 pints).</p>	<p>M5M4. Students will understand and compute the volume of a simple geometric solid.</p> <p>a. Understand a cubic unit (u^3) is represented by a cube in which each edge has the length of 1 unit.</p>
<p>M5M4. Students will understand and compute the volume of a simple geometric solid.</p> <p>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).</p>	<p>M5M4. Students will understand and compute the volume of a simple geometric solid.</p> <p>c. Derive the formula for finding the volume of a cube and a rectangular prism using manipulatives.</p>	<p>M5M4. Students will understand and compute the volume of a simple geometric solid.</p> <p>d. Compute the volume of a cube and a rectangular prism using formulae.</p>

<p>M5M4. Students will understand and compute the volume of a simple geometric solid. e. Estimate the volume of a simple geometric solid.</p>	<p>M5M4. Students will understand and compute the volume of a simple geometric solid. f. Understand the similarities and differences between volume and capacity.</p>	<p>M5G1. Students will understand congruence of geometric figures and the correspondence of their vertices, sides, and angles.</p>
<p>M5G2. Students will understand the relationship of the circumference of a circle to its diameter is pi ($\pi \approx 3.14$).</p>	<p>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.</p>	<p>M5A1. Students will represent and interpret the relationships between quantities algebraically. b. Investigate simple algebraic expressions by substituting numbers for the unknown.</p>
<p>M5A1. Students will represent and interpret the relationships between quantities algebraically. c. Determine that a formula will be reliable regardless of the type of number (whole numbers or decimal fractions) substituted for the variable.</p>	<p>M5D1. Students will analyze graphs. a. Analyze data presented in a graph.</p>	<p>M5D1. Students will analyze graphs. b. Compare and contrast multiple graphic representations (circle graphs, line graphs, bar graphs, etc.) for a single set of data and discuss the advantages/disadvantages of each.</p>
<p>M5D2. Students will collect, organize, and display data using the most appropriate graph.</p>	<p>M5P1. Students will solve problems (using appropriate technology). a. Build new mathematical knowledge through problem solving.</p>	<p>M5P1. Students will solve problems (using appropriate technology). b. Solve problems that arise in mathematics and in other contexts.</p>
<p>M5P1. Students will solve problems (using appropriate technology). c. Apply and adapt a variety of appropriate strategies to solve problems.</p>	<p>M5P1. Students will solve problems (using appropriate technology). d. Monitor and reflect on the process of mathematical problem solving.</p>	<p>M5P2. Students will reason and evaluate mathematical arguments. a. Recognize reasoning and proof as fundamental aspects of mathematics.</p>
<p>M5P2. Students will reason and evaluate mathematical arguments. b. Make and investigate mathematical conjectures.</p>	<p>M5P2. Students will reason and evaluate mathematical arguments. c. Develop and evaluate mathematical arguments and proofs.</p>	<p>M5P2. Students will reason and evaluate mathematical arguments. d. Select and use various types of reasoning and methods of proof.</p>

<p>M5P3. Students will communicate mathematically. a. Organize and consolidate their mathematical thinking through communication.</p>	<p>M5P3. Students will communicate mathematically. b. Communicate their mathematical thinking coherently and clearly to peers, teachers, and others.</p>	<p>M5P3. Students will communicate mathematically. c. Analyze and evaluate the mathematical thinking and strategies of others.</p>
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<p>M5P5. Students will represent mathematics in multiple ways. c. Use representations to model and interpret physical, social, and mathematical phenomena.</p>		

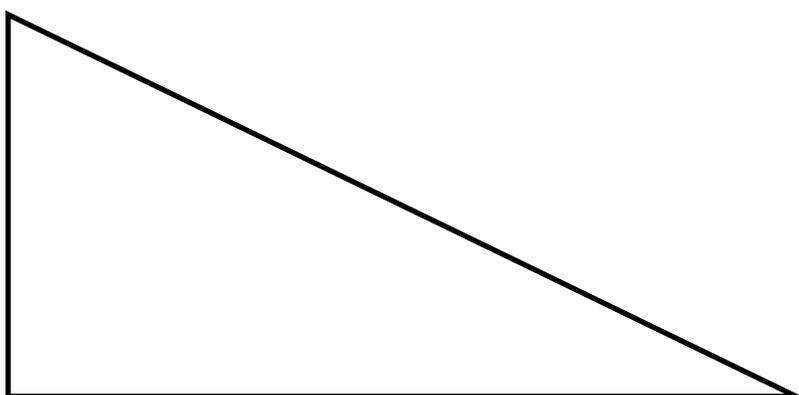
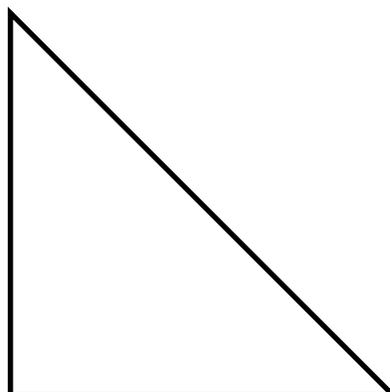
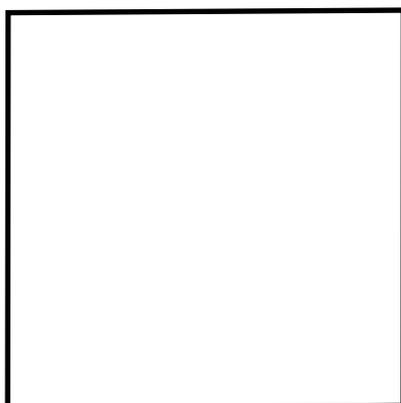
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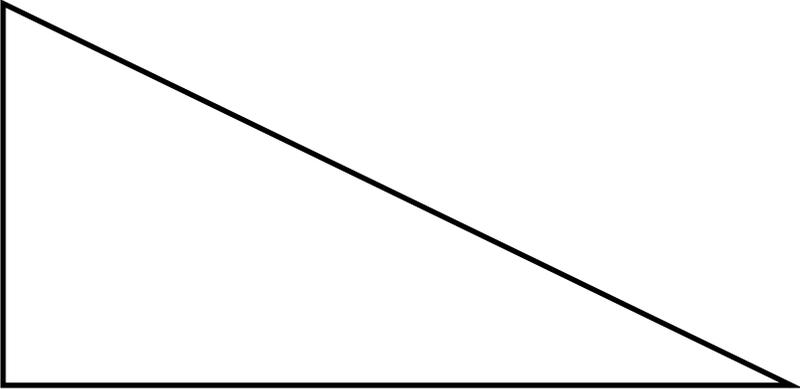
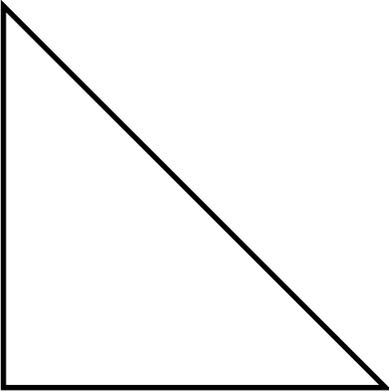
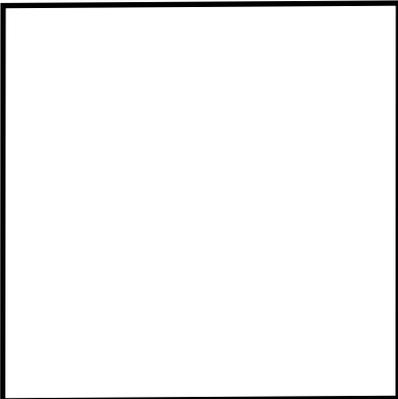
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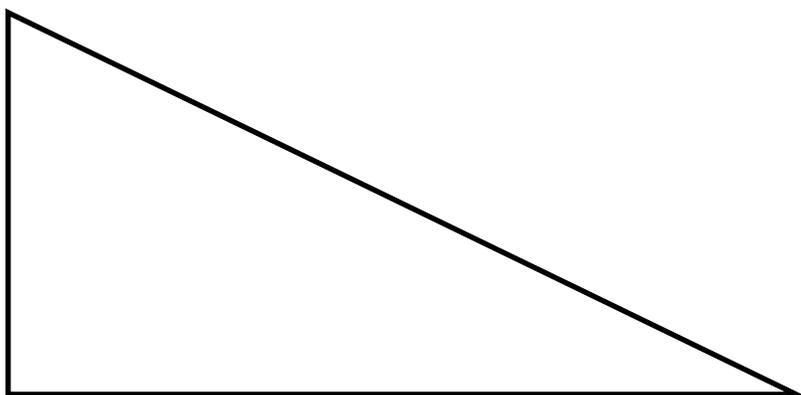
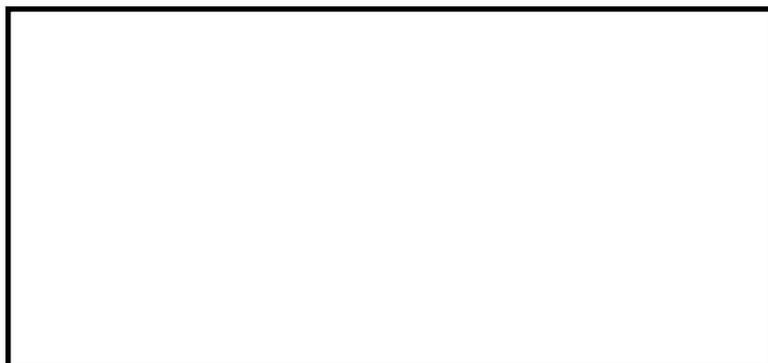
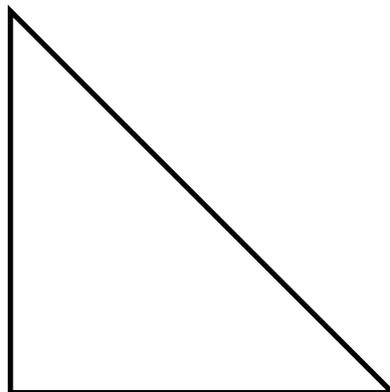
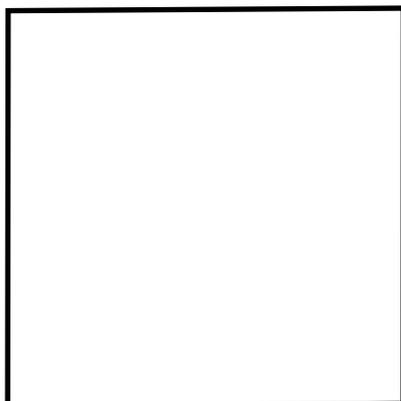
Important things I've learned or had reaffirmed. . .	Today's experiences have left me feeling. . .
Questions I want answered now. . .	What I will do when I return to my workplace. . .

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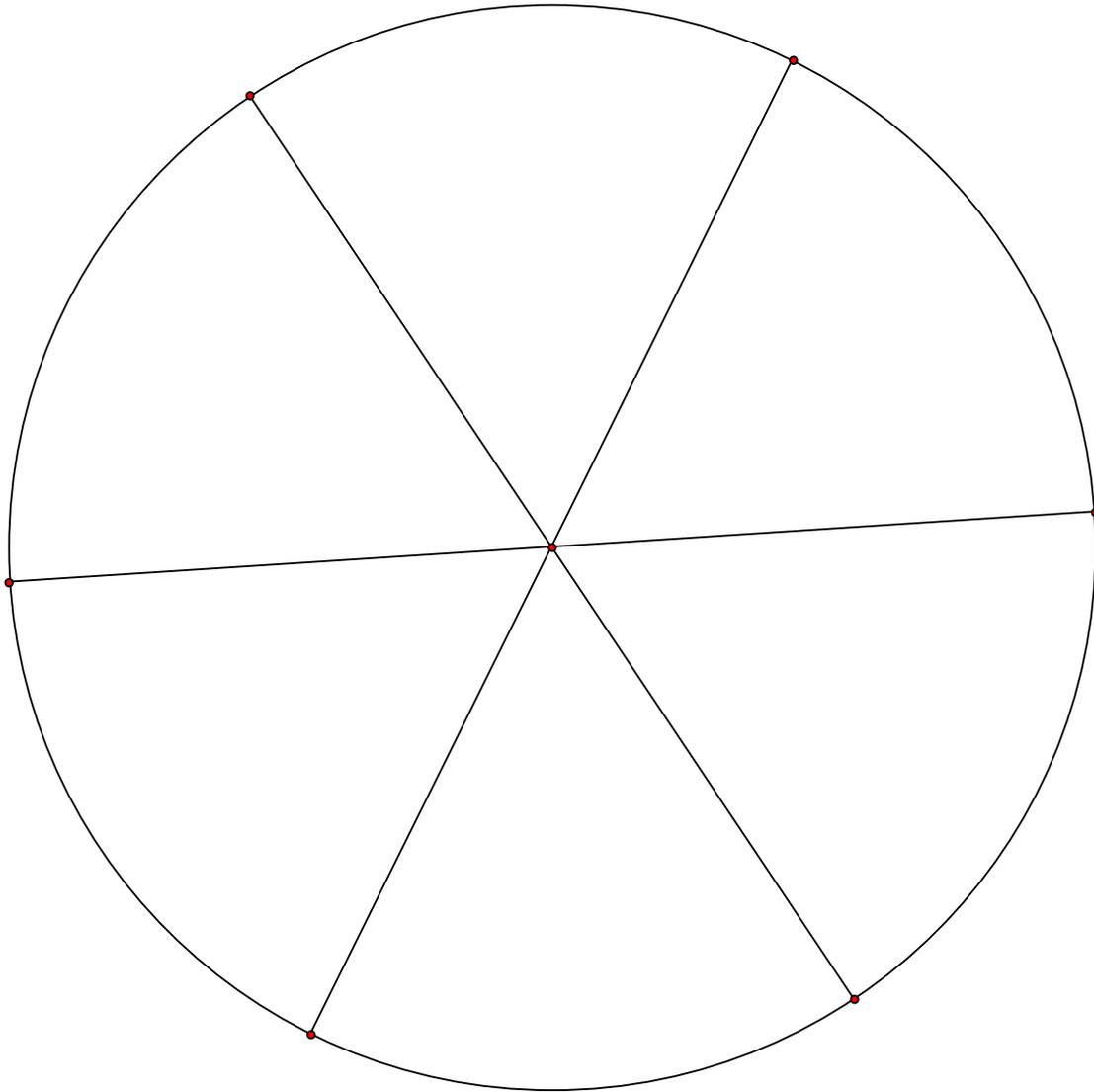




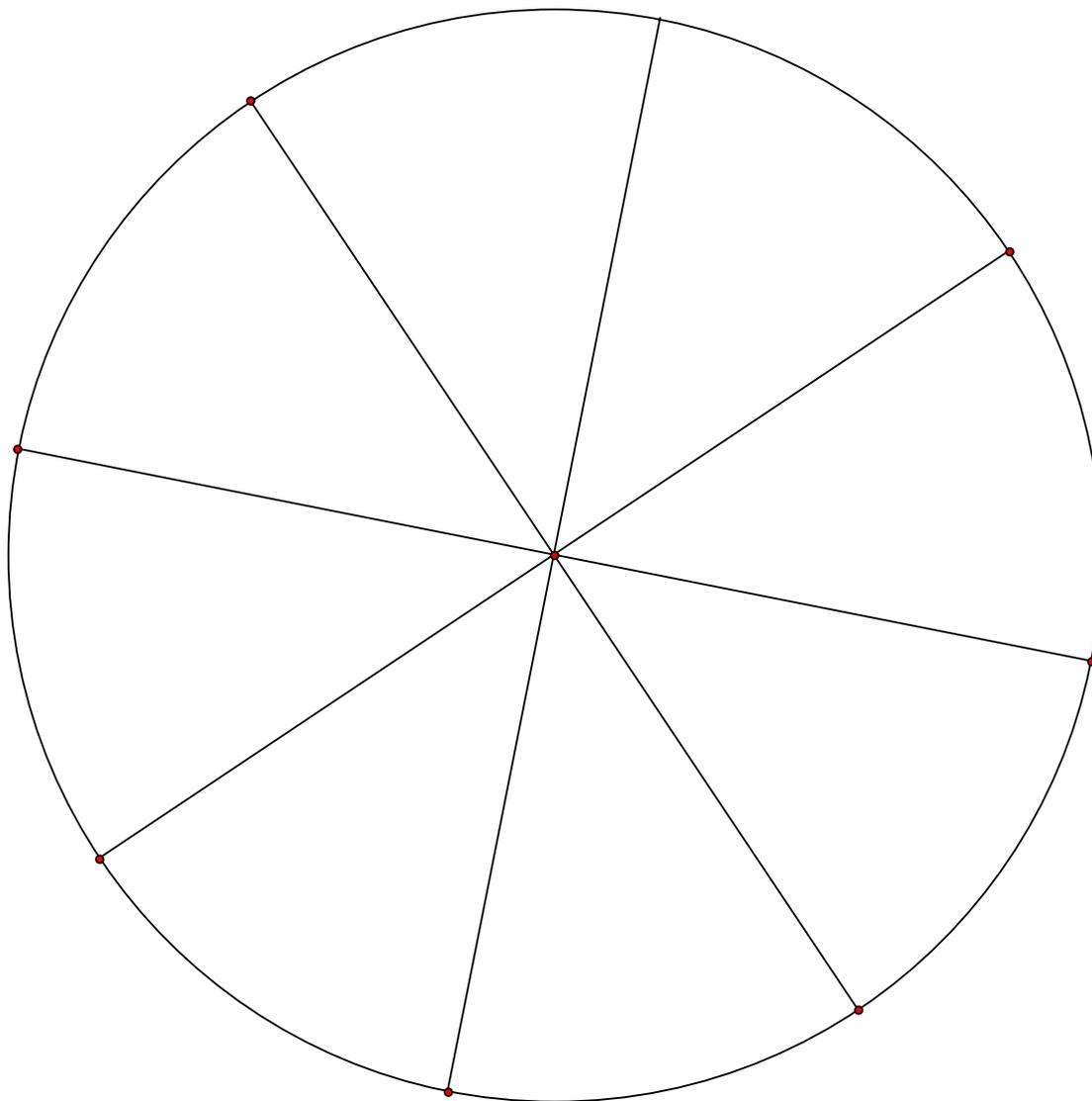


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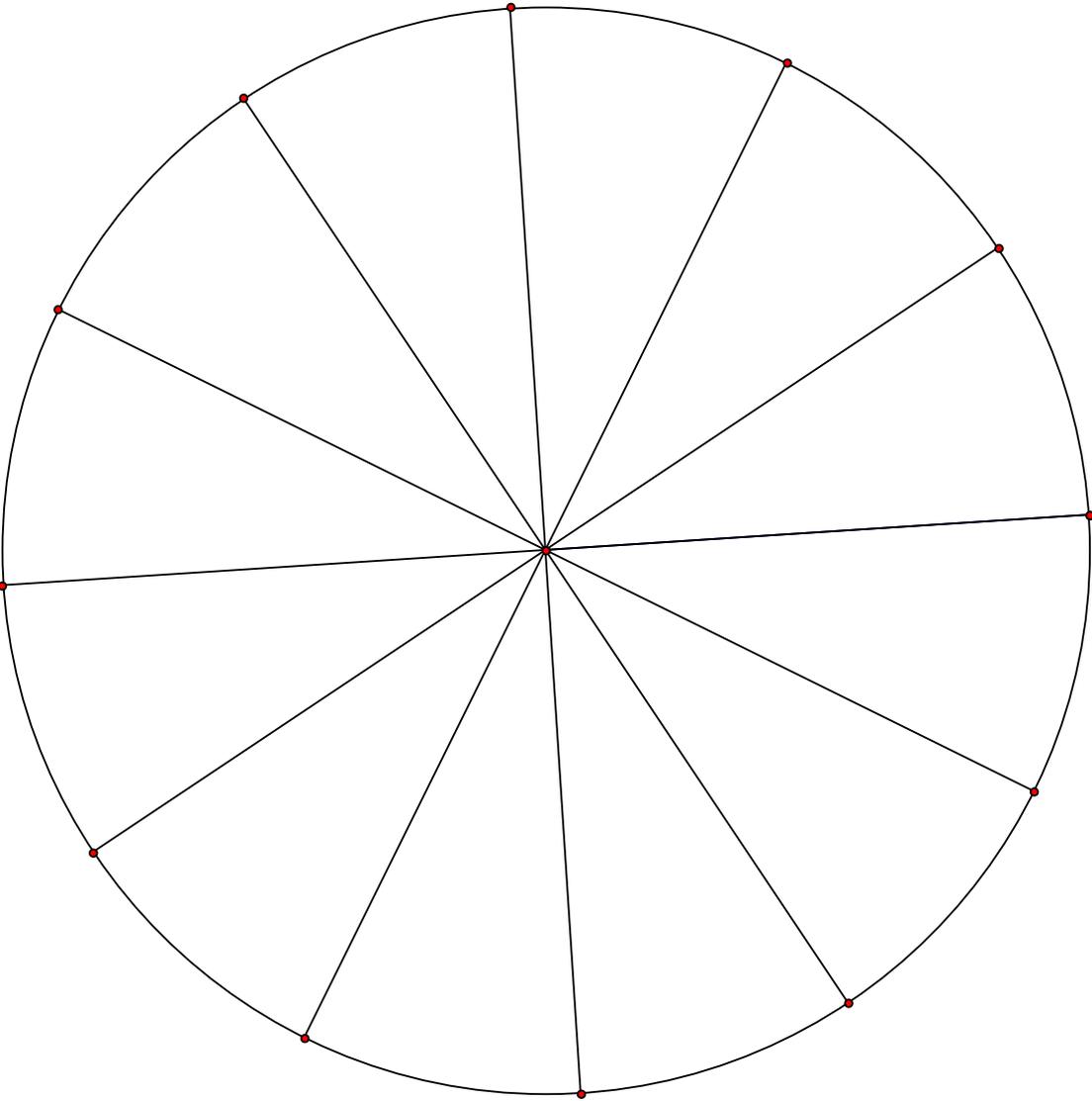
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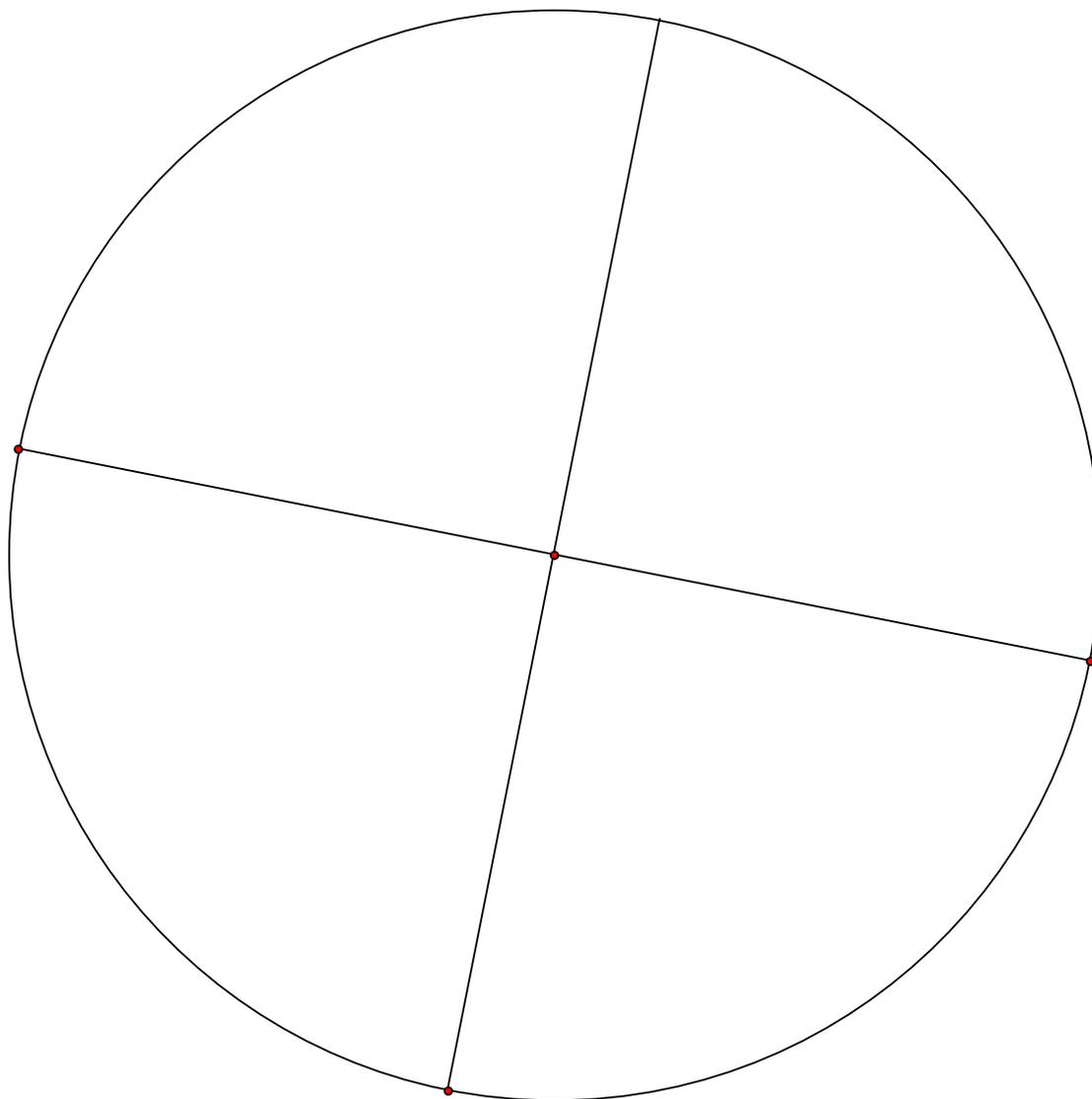
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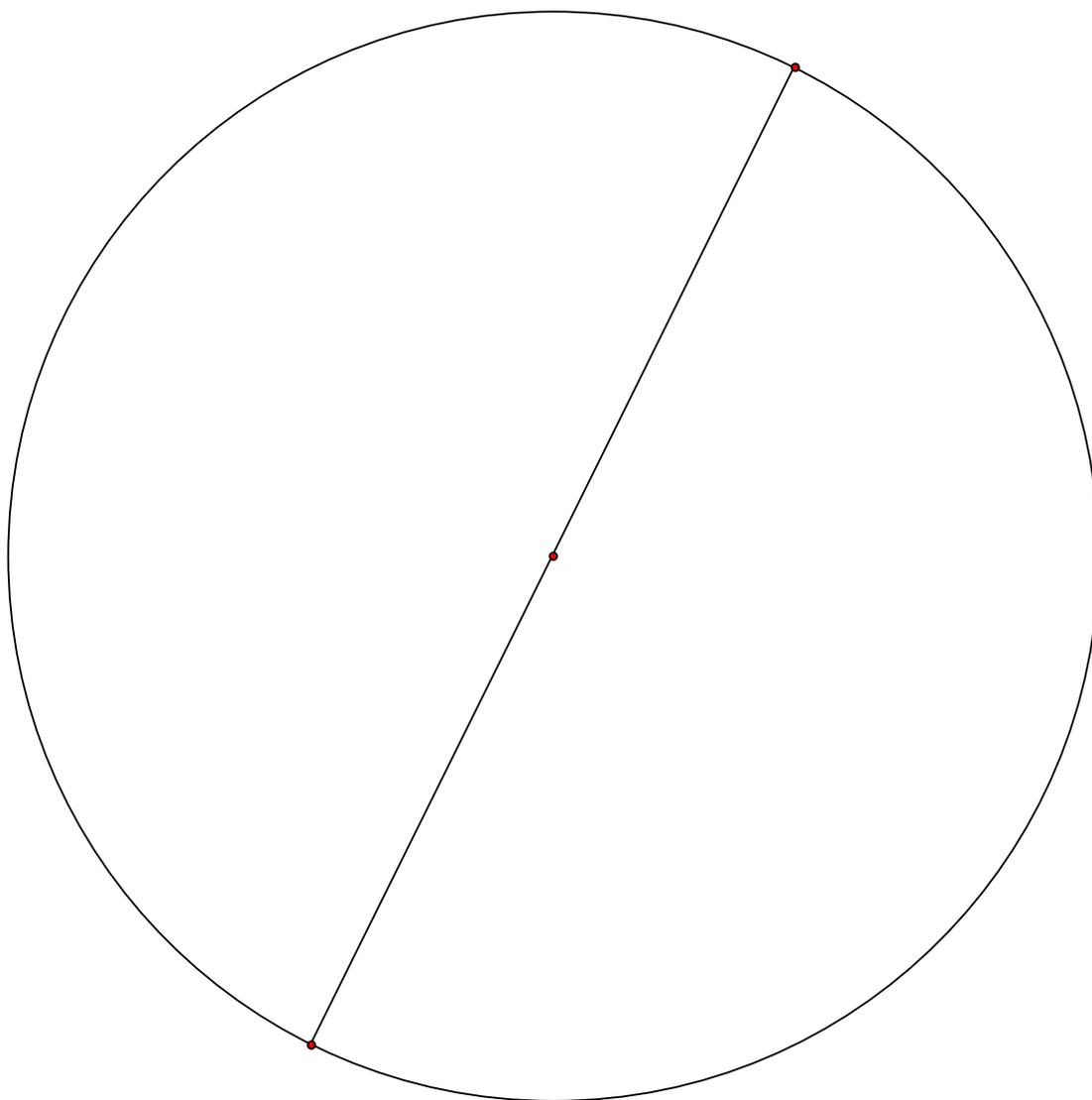
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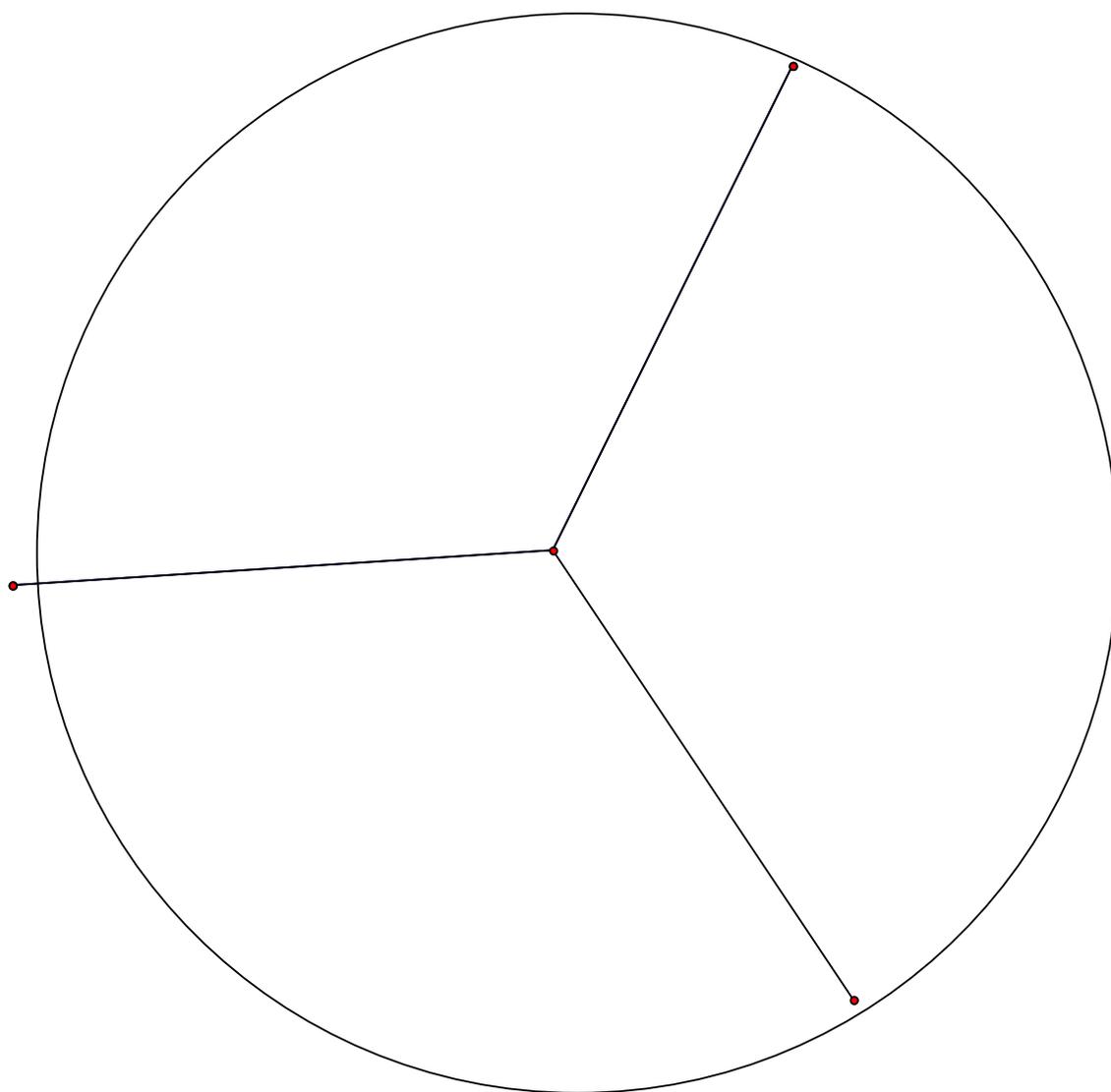
One-fourth



One-half



One-third



Unit #									
# of weeks									
Topic								Putting it all together	
Key Standards/ Elements ----- Supporting Standards/ Elements ----- Concepts/ Skills to Maintain								All standards	
All units will include skills to maintain and the Process Standards.									GPS Testing

Curriculum Map Template GPS Mathematics

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Unit #									
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