


Unit 1: Number Theory								
Overview: To introduce students to the Student Reference Manual; to review rectangular arrays and multiplication number models; to review and practice factoring, introduce prime, composite, and square numbers, and to develop exponents and square roots concepts.								
Big Ideas		Equivalence 1: Any number, numerical expression or equation can be represented in multiple ways. Number Relationships: There is an inverse relationship between addition and subtraction operations and between multiplication and division operations when using rational numbers.						
Performance Expectations		Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
1♦1	3.1.A Read, write, compare, order, and represent numbers to 10,000 using numbers, words, and symbols. 4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.	Identify places in whole numbers and decimals. PE 4.2.A				Refer to TLG p xxvi & xxvii. For Part 3, MM p7, 1 per 2 students.	Understand large numbers. PE 3.1.A▲ & 4.2.A	
1♦2	3.2.A Represent multiplication as repeated addition, arrays, counting by multiples, and equal jumps on the number line, and connect each representation to the related equation. 4.1.B Identify factors and multiples of a number. 4.3.C Determine the perimeter and area of a rectangle using formulas, and explain why the formulas work.	Use arrays to demonstrate commutative property of multiplication. PE 3.2.A	This is a good place to remind students that arrays can also represent the area of a rectangle PE 4.3.C . Area is not brought up again until unit 9. Start your word wall or anchor charts with examples to keep track of vocabulary as it is introduced. Note: Array museum is simply a display of sample arrays.	rectangular array, number model, Commutative Property of Multiplication, turn-around rule (for multiplication)		Post “Working with a Partner” principles. Prepare area for Class Data Pad & Array Museum. Refer to TLG p xxvii.	Build arrays and identify factors to describe them. PE 4.1.B	
1♦3	4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts. 4.1.B Identify factors and multiples of a number.	Find all factors of a number. PE 4.1.B	This is a good opportunity to introduce Exit Slips : The RSA on TLG p30 is the first opportunity for students to communicate their thinking. Model specifically how to use math log/notebook/exit ticket to establish a routine. Prompt on TLG p30 “Explain how you know you have all factor pairs for 20”.	factor, product, factor pair	<i>P2 Multiplication Top-It</i> . SRB p333, MM p493 PE 4.1.A		Identify factor pairs. PE 4.1.B	TLG p30, “Willa wrote $5 + 6 = 11$ for one of the facts in No.2. Is this answer correct? Explain why or why not.”
1♦4	4.1.B Identify factors and multiples of a number. 5.5.A Classify numbers as prime or composite. 5.6.G Explain why a specific problem-solving strategy or procedure was used to determine a solution.	Share and justify strategies to easily identify numbers with many and few factors. PE 4.1.B	A crucial component of playing any game is having a discussion about strategies. Before giving students the Exit Slip on TLG p35, lead a discussion of the strategies they found worked to their advantage.	factor, product, factor pair	<i>P1 Factor Captor</i> . SRB p306; <i>P3E Factor Captor with 1-110 Grid</i> . SRB p306, MM p455 PE 5.5.A	For Part 1, MM p453, 1 per 2 students plus 1 each for Study Link 1♦4. Consider MM p454, Grid 2. For Part 2, Students will cut out Fact Triangles. See TLG p xxvi.	Describe strategies that maximize scoring in <i>Factor Captor</i> . PE 5.6.G	
1♦5	4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line. 5.5.A Classify numbers as prime or composite.	Find patterns for divisibility rule. PE 5.5.A▼	Divisibility Rules: These can be fun, but the mathematics is not always transparent such as the rules for 3 & 9. Make sure you are connecting the rules for 2s, 5s, and 10s to patterns on a number grid.	factor rainbow, divisible by, quotient, divisibility rule	<i>P2 Factor Captor with choice of grids</i> . SRB p306, MM p453-4 PE 5.5.A		Understand large numbers. PE 4.2.A	TLG p40, “Explain how you solved No. 6.”
1♦6	3.2.A Represent multiplication as repeated addition, arrays, counting by multiples, and equal jumps on the number line, and connect each representation to the related equation. 5.5.A Classify numbers as prime or composite.	Define and classify prime and composite numbers. PE 5.5.A	Important vocabulary words. Make sure you use composite number and prime number throughout the year especially when students play Factor Captor.	composite number, prime number	<i>P1 Factor Captor</i> . SRB p306 PE 5.5.A	For Part 1, 2 copies of MM p413 for teacher. See TLG p42 for preparing Arrays Museum.	Factor numbers in the form of arrays. PE 3.2.A	TLG p46, “Explain how you know your answer is correct for No. 4”

1♦7	<p>3.2.A Represent multiplication as repeated addition, arrays, counting by multiples, and equal jumps on the number line, and connect each representation to the related equation.</p> <p>4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts.</p> <p>4.1.B Identify factors and multiples of a number.</p>	<p>Rename square numbers in standard notation. PE 3.2.A▲ & 4.1.A▲</p>	<p>In 5th grade, square numbers are the only exponential notation students need to understand as they are simply a different way to denote certain multiplication facts. ($10 \times 10 = 10^2$)</p>	<p>square array, square number, exponential notation, exponent key, exponent</p>	<p>P2 <i>Factor Bingo</i>: MM p452 PE 4.1.B</p>	<p>For Part 1, student calculators must have an exponent key.</p>	<p>Understand square numbers and exponential notation for square numbers. PE 3.2.A▲</p>	
1♦8	<p>4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts.</p> <p>4.1.B Identify factors and multiples of a number.</p>	<p>Use a factor rainbow to un-square a number. PE 4.1.B</p>	<p>This lesson may seem to be much about square roots, but really is simply listing the factors of a number and finding the factor without a pair.</p>	<p>un-squaring a number, square root, square-root key</p>	<p>P2 <i>Multiplication Top-It</i>: SRB p333, MM p493 PE 4.1.A</p>	<p>Teacher: practice using square root key on student calculators before lesson.</p>	<p>Solve and compare multiplication problems. PE 4.1.A</p>	<p>TLG p56, "Was Jason correct when he said that 64 is a prime number in No. 3? Explain your answer."</p>
1♦9	<p>4.1.B Identify factors and multiples of a number.</p> <p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>7.5.B Write the prime factorization of whole numbers greater than 1, using exponents when appropriate.</p>	<p>Use divisibility rules to create factor trees. PE 7.5.B▼</p>		<p>name-collection box, factor string, length of factor string, prime factorization</p>	<p>P2 <i>Name That Number</i>: SRB p325, MM p490 PE 5.4.C</p>	<p>Prepare a Name-Collection Box for the number '16' on Class Data Pad.</p>	<p>Correctly identify factors of a number. PE 4.1.B</p>	

Unit 2: Estimation and Computation							
Overview: To devise an estimation strategy to solve a problem; to subtract multidigit numbers using the trade-first and partial-difference methods; to review and apply vocabulary associated with chance events; to make magnitude estimates or products of multidigit numbers; to review and practice the lattice method for multiplication of numbers; and to understand the relative sizes of 1 million, 1 billion, and 1 trillion.							
Big Ideas		Estimation: Numerical calculations can be approximated by replacing numbers with other numbers that are close and easy to compute. Equivalence 2: Numbers represent set values that can be composed (put together) and decomposed (taken apart). Data: Data can be collected, classified, analyzed & displayed using tables, charts & graphs.					
Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
2+1 4.1.G Mentally multiply two-digit numbers by numbers through 10 and by multiples of 10. 4.4.E Determine the median, mode, and range of a set of data and describe what each measure indicates about the data. 4.5.H Analyze and evaluate whether a solution is reasonable, is mathematically correct, and answers the question.	Weigh the usefulness of median, minimum and maximum in estimation. PE 4.4.E & 4.5.H	Use a neighborhood map from google maps (http://maps.google.com/maps) to keep the mileage low and make the whole activity more manageable. Do the ft/min conversion as a guided practice to get to the median quicker and have enough time for discussion.	estimate, median		Possible 2 Day Lesson For Part 1, maps that show school and other locations 40 to 100 miles. For Part 3, phone book pages.	Solve extended facts problems mentally. PE 4.1.G	
2+2 3.1.C Fluently and accurately add and subtract whole numbers using the standard regrouping algorithms. 5.2.F Fluently and accurately add and subtract decimals.	Use partial-sums strategies for addition of whole numbers and decimals. PE 5.2.F	Have students refer to SRB p30 and use Base-10 blocks to model the EDM algorithms for addition and subtraction of decimals. <i>The National Library of Virtual Manipulatives</i> (http://nlvm.usu.edu) has a good practice activity in Grades 3-5 called "Base Blocks Decimals".	place, value, digit, algorithm, partial-sums method, place value, expanded notation, column-addition method	P2 <i>Addition Top-It</i> : SRB p333, MM p493 PE 5.2.F	2-day lesson. MM p415 for computation. Create poster showing expanded notation for a whole number and decimal.	Solve multidigit addition problems. PE 3.1.C	TLG p89, "Leroy rounded 56.199 to 60. Rosina said that he was incorrect. Do you agree or disagree with Rosina?"
2+3 2.2.D Add and subtract two-digit numbers mentally and explain the strategies used. 4.1.E Compare the values represented by digits in whole numbers using place value. 5.2.F Fluently and accurately add and subtract decimals.	Use partial-differences strategies for subtraction of whole numbers and decimals. PE 5.2.F		trade-first method, minuend, subtrahend, difference, partial-differences method	P2 <i>Subtraction Target Practice</i> : SRB p331 PE 4.1.E & 2.2.D	For Part 1, MM p415 for computation.	Use the trade-first method with subtraction problems. PE 5.2.F	TLG p96, "Explain how your know which angles in No. 5 are obtuse without measuring them."
2+4 5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	Share and justify solutions to number stories using open expressions (number sentences). PE 5.4.C	For vocabulary, make the differences between expression and equation very explicit to support PE 5.4.C .	number sentence, true number sentence, false number sentence, variable, open number sentence, relation symbol, operation symbol, solution, expression, equation	P2 <i>Name That Number</i> : SRB p325 PE 5.4.C	Prepare class chart from SRB p243. MM p42, 1 per 4 groups, cut apart.	Write open-number sentences to model given situations. PE 5.4.C	TLG p101, "Explain how 60×4 from No. 2 can help you solve $240 \div 60$."
2+5 4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line. 4.2.B Read, write, compare, and order decimals through hundredths. 4.4.E Determine the median, mode, and range of a set of data and describe what each measure indicates about the data. 5.5.B Determine and interpret the mean of a small data set of whole numbers.	Determine mode, median, mean, range, maximum and minimum from a set of data. PE 4.4.E & 5.5.B		stimulus, reaction time, mean (average), mode, range, minimum, maximum	P2 <i>High-Number Toss</i> (Decimals): SRB p321 PE 4.2.A	For Part 1, a timer that measures to the nearest second. Prepare two line plots; see TLG p106.	Compare decimals. PE 4.2.B	 Explain how to solve a problem involving multiplication and addition
2+6 5.6.I Summarize mathematical information, draw conclusions, and explain reasoning. 6.3.F Determine the experimental probability of a simple event using data collected in an experiment.	Estimate how likely an event is using probability expressed as fractions, decimals and percents. PE 6.3.F	Although this lesson addresses a 6 th grade standard, the content is appropriate for 5 th grade.	impossible, certain, Probability Meter Poster		Prepare Probability Meter Poster; see TLG p109. For Part 1, 1 portion and 10 thumbtacks per pair or see alternatives TLG p109.	Explain the structure of the Probability Meter. PE 5.6.I	TLG p114, "Write a number story for No. 2a."

2+7	<p>3.1.C Fluently and accurately add and subtract whole numbers using the standard regrouping algorithms.</p> <p>4.1.H Estimate products to approximate solutions to problems and determine reasonableness of answers.</p>	Use estimation to determine magnitude of answer in multiplication problems. PE 4.1.H		magnitude estimate	<i>P1 Multiplication Bull's Eye</i> : SRB p323 PE 4.1.H	Prepare 3 chart-paper sized Name Collection Boxes for 1, 10, 100; see TLG p115.	Add and subtract whole numbers. PE 3.1.C	
2+8	<p>4.1.F Fluently and accurately multiply up to a three-digit number by one- and two-digit numbers using the standard multiplication algorithm.</p> <p>4.1.H Estimate products to approximate solutions to problems and determine reasonableness of answers.</p>	Use magnitude estimate to verify reasonableness of partial-product results. PE 4.1.H	Multiplication of decimals is a 6 th grade standard. To support PE 4.1.F , students should use the EDM algorithm as they would for whole numbers and only place the decimal based on their estimates. See NOTE on TLG p122	partial-products method, magnitude estimate, ballpark estimate		Throughout Part 1, students use MM p415. For Part 3, transparencies of MM p416-417 cut out and taped together.	Make reasonable magnitude estimates based on number sentences. PE 4.1.H	
2+9	<p>4.1.B Identify factors and multiples of a number.</p> <p>4.1.F Fluently and accurately multiply up to a three-digit number by one- and two-digit numbers using the standard multiplication algorithm.</p> <p>4.1.H Estimate products to approximate solutions to problems and determine reasonableness of answers.</p> <p>6.1.F Fluently and accurately multiply and divide non-negative decimals.</p>	Use lattice method of multiplication for multidigit numbers. PE 4.1.F	Teachers have been encouraged to delay the introduction of this method until the end of 4 th grade because it is not transparent. Be sure that students are comfortable with its use before attempting any work with decimals. If needed, treat this lesson as an opportunity to re-teach the lattice method.	lattice method, lattice	<i>P Factor Bingo</i> PE 4.1.B	For Part 1, prepare a 1X2 and a 2X2 lattice. MM p419, 2 per student, 1 transparency.	Use the lattice multiplication method. PE 4.1.F & 6.1.F	TLG p130 - See RSA for Exit Slip Prompt. "Explain how to use the lattice multiplication method so solve $82 * 75$ and $8.2 * 7.5$."
2+10	<p>3.1.A Read, write, compare, order, and represent numbers to 10,000 using numbers, words, and symbols.</p> <p>4.1.E Compare the values represented by digits in whole numbers using place value.</p> <p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>5.6.G Explain why a specific problem-solving strategy or procedure was used to determine a solution.</p> <p>8.3.D Describe different methods of selecting statistical samples and analyze the strengths and weaknesses of each method.</p>	Use sampling strategies to compare order of magnitude for very large numbers. PE 8.3.D▼ & 5.6.G	In EDM naming numbers or collecting names is a reference equivalent values or alternate notations and expressions.	sample	<i>P2 High-Number Toss</i> : SRB p321, MM p487 PE 4.2.A ; <i>P3R Number Top-It (7-Digit)</i> : SRB p326, MM p491-2 PE 4.2.A▲ & 4.1.E	For Part 1, use Class Data Pad. Prepare table for time conversions; see TLG p132. For Part 3, prepare MM p491-492.	Know place value and compare numbers. PE 3.1.A▲	

Unit 3: Geometry Explorations and the American Tour

Overview: To explore data collection, organization, and interpretation; to review types of angles, geometric figures, and the use of geometry tools; to explore the geometric properties of polygons; and to explore side and angle relationships in regular tessellations.

Big Ideas **Chance:** The chance of an event occurring can be described numerically by a number between 0 and 1 inclusive and used to make predictions about events. **Measurement & Geometry:** Objects and two-dimensional shapes can be quantified, classified, described and analyzed by their attributes and by using unit amounts.

	Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
3♦1	2.1.C Identify the ones, tens, and hundreds place in a number and the digits occupying them. 3.1.A Read, write, compare, order, and represent numbers to 10,000 using numbers, words, and symbols. 4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.	Read and write large numbers. (American Tour Project) PE 3.1.A▲	Combine into 1 day Lesson: 3♦1 & 3♦2 Part 1 is optional. For additional practice with numbers in the millions, use Singapore Grade 5 Extra Practice book, Lesson 1, p. 1-3.	census	P2 <i>High Number Toss</i> (Decimals): SRB p321 PE 4.2.A	See TLG p154 for American Tour preparation.	Read and write large whole numbers. PE 3.1.A▲ & 2.1.C▲	
3♦2	3.1.A Read, write, compare, order, and represent numbers to 10,000 using numbers, words, and symbols. 3.1.C Fluently and accurately add and subtract whole numbers using the standard regrouping algorithms. 5.2.F Fluently and accurately add and subtract decimals.	Read and write large numbers. PE 3.1.A▲	Complete all activities in Part 2 for both lessons. Student Journal Pages and study links (HW) could be used as guided practice.				Add and subtract whole numbers and decimals. PE 3.1.C & 5.2.F	
3♦3	4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts. 8.2.C Demonstrate that the sum of the angle measures in a triangle is 180 degrees, and apply this fact to determine the sum of the angle measures of polygons and to determine unknown angle measures.	Determine the measure of angles using known measures. PE 8.2.C	Teach this lesson for exposure only. Do Math Message and other activities whole group if your students do not have solid background. Some students might relate to skateboarding turns such as '180' and '360'.		P2 <i>Multiplication Top-It</i> (2-digit * 1-digit): SRB p334 PE 4.1.A	For Part 1, pattern blocks for group work.	Identify angle measures using the relationship between circles and polygons. PE 8.2.C	TLG p168, "Explain how you solved No. 1. Include reasons why your answer is correct."
3♦4	5.3.B Identify, sketch, and measure acute, right, and obtuse angles.	Define and classify angles. PE 5.3.B		acute angle, obtuse angle, right angle, straight angle, reflex angle, Geometry Template, arc		Plan for management of Geometry Templates, label with numbers and assign to students..	Understand how to use full-circle and half-circle protractors. PE 5.3.B	
3♦5	4.1.G Mentally multiply two-digit numbers by numbers through 10 and by multiples of 10. 4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line. 6.4.A Determine the circumference and area of circles.	Determine relationship between radius and diameter. PE 6.4.A▼	Activities with Measuring Angles Formed by Intersecting Lines are Middle School work. Skip this last activity in part 1. It is grade level appropriate for 5 th graders to just be able to understand the relationship between radius and diameter at this time.	radius, diameter, vertical (or opposite) angles, adjacent angles	P2 <i>High Number Toss</i> (Decimals): SRB p321 PE 4.2.A	For Part 1, 2 foot square sheet of paper for demo.	Solve extended multiplication facts mentally. PE 4.1.G	TLG p181, "In No. 5, will there be an even or an odd number of factors?"
3♦6	1.3.A Compare and sort a variety of two- and three-dimensional figures according to their geometric attributes. 4.2.B Read, write, compare, and order decimals through hundredths. 5.3.B Identify, sketch, and measure acute, right, and obtuse angles. 5.3.C Identify, describe, and classify triangles by angle measure and number of congruent sides. 5.3.H Determine the number and location of lines of symmetry in triangles and quadrilaterals.	Classify triangles as isosceles, equilateral, or scalene. PE 5.3.C		equilateral triangle, isosceles triangle, scalene triangle, congruent	P2 <i>Angle Tangle</i> : SRB p296, MM p444; PE 5.3.B; P3R <i>Triangle Sort</i> : MM p504; PE 5.3.H P3E <i>Sides and Angles: Triangles</i> : MM p502; PE 1.3.A; P3EP <i>Where Do I Fit In?</i> : SRB p144, MM p510 PE 5.3.H	For Part 1, 8-in, 6-in & 4-in straws plus connectors.	Compare decimals. PE 4.2.B	TLG p187, "Maddie did problem No. 4 by drawing and naming a trapezoid. What's wrong with that answer? How would you help Maddie know the correct figure to draw and name?"

3↔7	<p>3.4.A Identify and sketch parallel, intersecting, and perpendicular lines and line segments. 5.3.A Classify quadrilaterals. 5.3.C Identify, describe, and classify triangles by angle measure and number of congruent sides. 5.3.G Draw quadrilaterals and triangles from given information about sides and angles. 5.3.H Determine the number and location of lines of symmetry in triangles and quadrilaterals.</p>	Classify polygons by their attributes. PE 5.3.A			<p>P1 <i>Polygon Capture</i>: SRB p328, MM p494-7 PE 5.3.C, 5.3.A, & 3.4.A; P3ELL <i>What's My Attribute Rule?</i>: MM p508-9 PE 5.3.H</p>	For Part 1, students cut out polygons and Property Cards from back of journals. Transparency of MM p494, cut apart.	Recognize the relationship between sides and angles in polygons. PE 5.3.G	TLG p192, "Explain how you determined the first number pattern in No. 4."
3↔8	<p>2.4.A Solve problems involving properties of two- and three-dimensional figures. 5.3.B Identify, sketch, and measure acute, right, and obtuse angles</p>	Identify, describe, and create tessellations. PE 2.4.A▲		regular polygon, tessellation, regular tessellation, tessellate, tessellation vertex	<p>P2 <i>Angle Tangle</i>: SRB p296, MM p444 PE 5.3.B</p>	Prepare space for Tessellation Museum.	Draw, estimate and measure angles. PE 5.3.B	
3↔9	<p>8.2.C Demonstrate that the sum of the angle measures in a triangle is 180 degrees, and apply this fact to determine the sum of the angle measures of polygons and to determine unknown angle measures.</p>	Determine the exact sum of the angles for different polygons. PE 8.2.C	Touch & Go : Make this a one day lesson . Focus on sum of the angles for triangles and quadrilaterals. (PE is for middle school.) Complete all of Part 2.			2 day lesson . See directions TLG p199 for line plot poster.	Understand angle measures and relationships in polygons. PE 8.2.C	TLG p204, "John called his drawing in No. 4 a parallelogram, and Jack called his drawing a rhombus. Who was correct?"
3↔10	<p>3.4.A Identify and sketch parallel, intersecting, and perpendicular lines and line segments. 5.1.D Estimate quotients to approximate solutions and determine reasonableness of answers in problems involving up to two-digit divisors. 5.3.A Classify quadrilaterals. 5.3.C Identify, describe, and classify triangles by angle measure and number of congruent sides. 5.3.G Draw quadrilaterals and triangles from given information about sides and angles.</p>	Identify and draw polygons according to given properties. PE 5.3.G		radius, diameter, pentagon, perimeter	<p>P2 <i>Polygon Capture</i>: SRB p328, MM p494-7 PE 5.3.C, 5.3.A, & 3.4.A</p>	2 or more day lesson . Consider revisiting problems over several weeks.	Make magnitude estimates for division with large numbers. PE 5.1.D	

Connected Mathematics 2: Prime Time Unit (Investigation 1)

PT↔1	<p>4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts. 4.1.B Identify factors and multiples of a number. 5.5.A Classify numbers as prime or composite.</p>	<p>CMP2 Prime Time, Investigation 1 (2 Days): This first Investigation begins with an introduction to The Factor Game in lessons 1.1 & 1.2 which is very similar to EDM's Factor Captor. Spend a little time reviewing the game if needed and begin with lesson 1.3 which covers the Product Game.</p>
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Connected Mathematics 2: Prime Time Unit (Investigations 2 through 4)

PT↔1 - PT↔4	<p>4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts. 4.1.B Identify factors and multiples of a number. 4.1.D Multiply by 10, 100, and 1,000. 4.1.G Mentally multiply two-digit numbers by numbers through 10 and by multiples of 10. 5.2.D Determine the greatest common factor and the least common multiple of two or more whole numbers. 5.5.A Classify numbers as prime or composite.</p>	<p>CMP2 Prime Time, Investigations 2-4 (15 Days): This unit focuses on factors, multiples and prime & composite numbers, and prime factorization. This work also reinforces 4th & 5th grade standards that are foundational for division and fractions in 5th grade. The Process Strands are also well supported by Prime Time. You may want to do the ACE activities in class instead of assigning them for homework. "The Locker Problem" in Investigations 5 is optional and could be done at the end of the year.</p>
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Unit 4: Division								
Overview: To review multiplication and division facts and to apply basic facts to division with 1-digit divisors; to review and practice the partial-quotients division algorithm with whole numbers; to use the partial-quotients algorithm to divide decimals by whole numbers; and to practice solving division number stories and interpreting the remainder.								
Big Ideas		Equivalence 1: Any number, numerical expression or equation can be represented in multiple ways. Estimation: Numerical calculations can be approximated by replacing numbers with other numbers that are close and easy to compute.						
	Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
4↕1	5.1.E Mentally divide two-digit numbers by one digit divisors and explain the strategies used. 5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	Share and justify strategies for mental division. (breaking numbers into friendly parts) PE 5.1.E		dividend, divisor, quotient, multiples	P2 <i>Name That Number</i> . SRB p325 PE 5.4.C	For Part 1, make posters showing names of parts of multiplication and division problems and relating them to fact families.	Use multiplication and division facts for division with 1-digit divisors. PE 5.1.E	TLG p234, “Explain your answer to No. 4.”
4↕2	5.1.C Fluently and accurately divide up to a four digit number by one- or two-digit divisors using the standard long-division algorithm. 5.1.E Mentally divide two-digit numbers by one digit divisors and explain the strategies used.	Use the partial-quotients algorithm for problems. PE 5.1.C		dividend, divisor, partial quotient, quotient, remainder	P1 <i>Division Dash</i> . SRB p303 PE 5.1.E	For Part 1, MM p415, 2 per student.	Understand the partial-quotients algorithm. PE 5.1.C	TLG p240, “Explain why your answer to No. 4 is correct.”
4↕3	3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line. 4.1.D Multiply by 10, 100, and 1,000. 4.1.G Mentally multiply two-digit numbers by numbers through 10 and by multiples of 10. 4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line. 5.1.B Determine quotients for multiples of 10 and 100 by applying knowledge of place value and properties of operations.	Use multiplication and a map scale to determine distances. (American Tour Project) PE 4.1.G & 3.3.A	Optional Lesson. Instead of Part 1, have students practice determining products and quotients for multiples of 10 and 100 to support PE 4.1.D by using Singapore Math Extra Practice Grade 3, pp. 55-57. Do Part 2.	map legend, or map key, map direction symbol, map scale			Recognize decimal places to the thousandths. PE 4.2.A▲	
4↕4	4.1.B Identify factors and multiples of a number. 5.1.B Determine quotients for multiples of 10 and 100 by applying knowledge of place value and properties of operations. 5.1.C Fluently and accurately divide up to a four digit number by one- or two-digit divisors using the standard long-division algorithm. 5.1.F Solve single- and multi-step word problems involving multi-digit division and verify the solutions. 5.5.A Classify numbers as prime or composite.	Share and justify solution paths for division using the partial-quotients algorithm. PE 5.1.C & 5.1.B		multiple, divisor, partial quotient, dividend	P1 <i>Divisibility Dash</i> . SRB p302 PE 5.5.A & 4.1.B	For Part 1, MM p415, 2 per student, and a coin. For Part 3, MM p111 as needed.	Write a division number story. PE 5.1.F▲	

4↕5	<p>5.1.A Represent multi-digit division using place value models and connect the representation to the related equation.</p> <p>5.1.D Estimate quotients to approximate solutions and determine reasonableness of answers in problems involving up to two-digit divisors.</p> <p>5.1.E Mentally divide two-digit numbers by one digit divisors and explain the strategies used.</p> <p>5.6.H Analyze and evaluate whether a solution is reasonable, is mathematically correct, and answers the question.</p>	Use magnitude estimate to justify reasonableness of answers. PE 5.1.D & 5.6.H.	To support PE 5.1.A , use the Readiness activity (modeling with base-10 blocks). Division of decimals is a 6 th grade standard. Use this opportunity to practice multi-digit division of whole numbers. Students should remove the decimal point and use the EDM algorithm as they would for whole numbers	decimal point, magnitude estimate	<i>P2 Division Top-It</i> : SRB p334, MM p493 PE 5.1.E	For Part 3, review column-addition algorithm on MM p115 and SRB p24 & p44.	Make magnitude estimates for division. PE 5.1.D	TLG p257, "Explain how you used the table data in No. 1 to make your prediction. Include the number models for your calculations."
4↕6	<p>5.1.C Fluently and accurately divide up to a four digit number by one- or two-digit divisors using the standard long-division algorithm.</p> <p>5.6.H Analyze and evaluate whether a solution is reasonable, is mathematically correct, and answers the question.</p>	Interpret the remainder within context of number stories. PE 5.1.C & 5.6.H				For Parts 1 & 2, copies of MM p415.	Interpret the remainder. PE 5.1.C & 5.6.H	TLG p263, "Compare the prime factorization for 200 in No. 3 with the prime factorization for 400."
4↕7	<p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p>	Solve equations (number models) for given variables. PE 5.4.C	Modification: To specifically address PE 5.4.C have students write out algebraic expressions for some of the cards while playing First to 100. Example: "How many inches are there in x feet?" Student writes "in = 12x", then rolls a 4 and 2 for a product of 8 and writes "x = 8" then solves the problem inserting 8 for x "in = 12*8 = 96". Spend an additional day for Readiness and Extra Practice activities in part 3.	variable, expression, equation	<i>P1 First to 100</i> : SRB p308, MM p456-8 PE 5.4.C ; <i>P3E Algebra Election</i> : SMJ p118-9, MM p442-3&456-7 PE 5.4.C	2-day lesson For Part 1, MM p118 1 per 6 students, cut apart. Review rules, scoring and Problem Cards for <i>First to 100</i> , MM p456-457. For Part 3, prepare MM p442-443, 1 per group.	Solve for a given variable. PE 5.4.C	

Connected Mathematics 2: Bits & Pieces I Unit (Investigations 1 & 2)

B1↕1 - B1↕2	<p>3.3.B Compare and order fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12.</p> <p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>4.2.F Write a fraction equivalent to a given fraction.</p> <p>4.2.I Solve single- and multi-step word problems involving comparison of decimals and fractions (including mixed numbers), and verify the solutions.</p> <p>5.2.C Given two fractions with unlike denominators, rewrite the fractions with a common denominator.</p>	<p>CMP2 Bits & Pieces I, Investigations 1 & 2 (12 Days): This unit focuses on fractions using fraction strips and number line models as well as various methods to compare fractions. Investigation 3 (scheduled for after Unit 5) will focus on the relationship between fractions, decimals & percents. Although most of this work addresses 4th grade standards, 5th grade students often benefit from extensive review in order to be successful with 5th grade fraction work. You may want to do the ACE activities in class and use any previously skipped Math Boxes for homework during this unit. The Process Strands are also well supported by Bits & Pieces I.</p>
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Unit 5: Fractions, Decimals, and Percents

Overview: To review fraction concepts, such as exploring mixed numbers, comparing and ordering fractions, and finding equivalent fractions; to practice turning fractions into decimals and percents; and to review the properties and construction of bar and circle graphs.

Big Ideas **Equivalence 1:** Any number, numerical expression or equation can be represented in multiple ways. **Number 1:** Numbers have a unique point on the number line. Two numbers are equal when they represent the same point on the number line. **Number 2:** A fraction represents a comparison of part to the whole (region, set, segment).

	Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
5•1	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =.</p> <p>6.3.D Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.</p>	Determine the whole set or fractions of a set. PE 3.3.A▲	<p>Optional Lesson: This lesson is mostly review. Since your students have completed Bits & Pieces Investigations 1 & 2 they might not need extensive review except for the Parts to Whole Problems on TLG p292.</p>	whole (ONE, or unit), denominator, numerator, unit fraction	P2 <i>Fraction Top-It</i> : SRB p316, MM p462-3 PE 4.2.E	Prepare display area for Fractions, Decimals and Percents Museum. Ask students to bring examples. Part 2 uses MM p462-3 fraction cards cut out and stored (cardstock).	Demonstrate an appropriate strategy for finding the unit fraction of a set. PE 6.3.D	
5•2	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =.</p> <p>6.3.D Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.</p>	Use pattern blocks to find equivalent names between improper fractions and mixed numbers with changing ONE. PE 4.2.C	Use Singapore Math Grade 4 Extra Practice Book, Exercise 10, p23-24 for additional examples. Problem 3, Math Boxes SJM p128 is a great example of a multi-step division problem. Consider using this problem as a focused discussion on problem solving.	improper fraction, mixed number		Use pattern blocks to model activities (document camera). Prepare class data pad with pattern block drawings.	Find the value of a region based on a defined unit fraction. PE 3.3.A▲	
5•3	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =.</p>	Share and justify strategies for comparing and ordering fractions on a fraction stick chart. PE 4.2.E	Play online game, "Find Grampy" to practice naming fractional points on a number line. http://visualfractions.com/Games.htm	fraction stick, equivalent fractions	P2 <i>Fraction Top-It</i> (Addition): SRB p316, MM p462-3 PE 4.2.E	MM p137 for teaching. Part 3 (R) 6 strips of colored paper per student 2 ½ X 8 inches.	Explain the relationship between the numerator and denominator. PE 3.3.A	TLG p306, "Explain how you converted the fractions to mixed numbers in No. 2."
5•4	<p>4.2.F Write a fraction equivalent to a given fraction.</p> <p>5.5.A Classify numbers as prime or composite.</p>	Generate equivalent fractions by using multiplication or division of a fractional ONE equivalent. PE 4.2.F	After studying fractions conceptually in Bits & Pieces I, it is appropriate for students to learn a more algorithmic way to find equivalent fractions such as the one in this lesson.	equivalent fractions	P2 <i>Factor Captor</i> : SRB p306, MM p454-5 PE 5.5.A	Review key procedures for your students' calculators, SRB p259-62.	Find equivalent fractions. PE 4.2.F	
12•4 & 12•5	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>4.2.G Simplify fractions using common factors.</p>	Use fractions of a set strategies to solve ratio problems.	Optional Lessons 12•4 & 12•5: Use Singapore Math Grade 5 Extra Practice Book, Exercise 21 starting on p37, problems 1-5 to pre-assess your students' abilities to solve problems involving fractions of a set. If your students need additional practice use lessons 12•4 & 12•5 as follows: Begin with 12•4, Readiness Activity: Writing Ratios in Simplest Form to review PE 4.2.G . Do all of Part 1 for both lessons. Do Part 2 for 12•5 only and appropriate math boxes. Note: Although ratios are a 7 th grade standard, these word problems are good for fractions of a set practice. Provide clarification when reading the problems to your students to set it in the context of fractions. Example: SMJ2 p408, Problem #1, the question can be restated as "What is three-fourths out of 28?"			2 Days Total. For Part 1, provide a small envelope for each student to save tiles cut from SMJ2, Activity Sheet 7. Consider using 2 colors of square plastic tiles or 2-color counters for Part 1 instead of cutting out paper tiles.		
5•5	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>8.2.E Quickly recall the square roots of the perfect squares from 1 through 225 and estimate the square roots of other positive numbers.</p>	Rename fractions and mixed numbers as decimals using a hundred-grid. PE 4.2.D.	Be aware that some of the material in the next few lessons will also be covered in Bits & Pieces, Investigation 3, but the work in CMP2 will be more challenging.	round down, round up, round to the nearest...	P1 <i>Estimation Squeeze</i> : SRB p304 PE 8.2.E		Convert between equivalent number forms. PE 4.2.D	

5♦6	<p>4.1.E Compare the values represented by digits in whole numbers using place value.</p> <p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols $<$, $>$, or $=$.</p>	<p>Rename fractions and mixed numbers as decimals using a fraction stick chart. PE 4.2.D▲</p>			<p>P3R <i>Number Top-It</i> (3-Place Decimals): SRB p327, MM p493 PE 4.2.A▲ & 4.1.E</p>	<p>For Part 1, Teaching Master of MM p137-8. For Part 3 (E), transparency of MM p141, 1 per 6 students, cut apart.</p>	<p>Compare fractions. PE 4.2.E</p>	
5♦7	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>5.6.G Explain why a specific problem-solving strategy or procedure was used to determine a solution.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Rename fractions and mixed numbers as decimals using a calculator. PE 4.2.D▲ & 6.3.C</p>		<p>repeating decimal</p>	<p>P1 2-4-5-10 <i>Frac-Tac-Toe</i>: SRB p309-11, MM p472&474 PE 6.3.C▼ & 4.2.D</p>	<p>Teaching Master of MM p472 to demo game. Store and keep game boards for future use.</p>	<p>Understand fractional and decimal relationships. PE 5.6.G</p>	<p>TLG p329, "Explain how you round 0.725 to the nearest hundredth in No.1."</p>
5♦8	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Define the meaning and purpose of percents. PE 6.3.C</p>	<p>Although percents is a 6th grade standard, the concepts of fractions, decimals and percents are so interlinked that they should not be taught separately. Note that this is just a calculator activity. Your student will have more time to work on these concepts as they will be covered more in depth in Bits & Pieces I, Investigation 3.</p>	<p>percent</p>	<p>P2 2-4-5-10 <i>Frac-Tac-Toe (%)</i>: SRB p309-11, MM p472&476 PE 6.3.C▼ & 4.2.D; P3R <i>Fraction/Percent Concentration</i>: SRB p315, MM p467-8 PE 6.3.C</p>	<p>Part 3 (R), prepare MM p467-8, two-sided, cardstock game cards, cut apart and stored.</p>	<p>Recognize percent equivalents for fractions. PE 6.3.C</p>	<p>TLG p335, "Explain the strategies you used to compare and order the fractions in No. 5."</p>
5♦9	<p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Compare properties of a bar graph and a circle graph. PE 6.3.C</p>	<p>Optional Lessons, Part 1: Assign these math boxes sometime during Unit 6. Part 2 activity "Measuring Angles Perimeter and Area" has been moved to Lesson 6♦B</p>	<p>bar graph, circle (or pie) graph</p>		<p>For Part 1, make poster of table from Study Link 5♦8. For Part 3, (R) cut string and draw a circle. See TLG p337. Save snack-survey data for 5♦11.</p>	<p>Demonstrate knowledge of bar and circle graphs. PE 6.3.C</p>	<p>TLG p340, "You have been asked to report the results of the preferred lunch survey in No. 3. Which graph would you use in your presentation? Explain why."</p>
5♦10	<p>7.4.D Construct and interpret histograms, stem and-leaf plots, and circle graphs.</p>	<p>Estimate fractional sector sizes of a circle graph to determine percentages. PE 7.4.D</p>		<p>percent circle, sector</p>		<p>MM p426 and MM p147. Part 3 (E) prepare 2" black circle. Collect bar graph examples (SEE TLG p348) Save Study-Link data from 5♦10 for 6♦1</p>	<p>Estimate and find the percent measure of circle graph sectors. PE 7.4.D</p>	

5♦11	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p> <p>7.4.D Construct and interpret histograms, stem and-leaf plots, and circle graphs.</p>	Find fraction and percent equivalents. PE 6.3.C	Optional Lessons, Part 1: Assign these math boxes sometime during Unit 6.	P1 <i>Fraction Of</i> : SRB p313, MM p464-6&469 PE 3.3.A▲	Part 1, prepare chart of snack-survey data from 5♦9. Part 3 (R), prepare MM p428 before copying.	Demonstrate understanding of how to use the data-set fractions to draw circle sectors. PE 7.4.D	
5♦12	<p>5.1.D Estimate quotients to approximate solutions and determine reasonableness of answers in problems involving up to two-digit divisors.</p> <p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>5.6.I Summarize mathematical information, draw conclusions, and explain reasoning.</p>	Answer questions based on graphs and tables. (American Tour Project) PE 5.6.I			P2 <i>Name That Number</i> : SRB p325 PE 5.4.C	Part 3 (EP) uses collected bar graph examples, 1 per student.	Estimate answers. PE 5.1.D

Connected Mathematics 2: Bits & Pieces I Unit (Investigations 3)

B1♦3	<p>3.3.B Compare and order fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12.</p> <p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>4.2.F Write a fraction equivalent to a given fraction.</p> <p>4.2.I Solve single- and multi-step word problems involving comparison of decimals and fractions (including mixed numbers), and verify the solutions.</p> <p>5.2.C Given two fractions with unlike denominators, rewrite the fractions with a common denominator.</p>	<p>CMP2 Bits & Pieces I, Investigations 3 (7 Days): This part of the unit focuses on the relationship between fractions, decimals & percents. Many of this content will be very similar to what has just been covered in EDM unit 5, but it will have more challenging problems and more in depth discussions. You may want to do the ACE activities in class and use any previously skipped Math Boxes for homework during this unit. The Process Strands are also well supported by Bits & Pieces I.</p>
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Unit 6: Using Data; Addition and Subtraction of Fractions								
Overview: To use data from surveys to begin using stem-and-leaf plots and investigate the effect of sample size; to read and use contour maps that show climate and growing-season data; and to revisit addition and subtraction of fractions.								
Big Ideas		Data: Data can be collected, classified, analyzed & displayed using tables, charts & graphs. Number 1: Numbers have a unique point on the number line. Two numbers are equal when they represent the same point on the number line. Equivalence 2: Numbers represent set values that can be composed (put together) and decomposed (taken apart).						
Performance Expectation		Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
6♦A & 6♦B	4.4.E Determine the median, mode, and range of a set of data and describe what each measure indicates about the data. 5.5.B Determine and interpret the mean of a small data set of whole numbers.	Graph a data set and determine the mean. PE 5.5.B	Supplemental Lessons: Grade 3 Lessons 10♦6 & Lesson 10♦7 Mean has been 'Touch and Go' in most prior grades lessons. These lessons will formally introduce mean to your students from conceptual to computational understanding. 10♦6: Complete Part 1. Then, instead of Part 2, have your students fill in 3 rd grade, SMJ p251, but only measure and record their arm span and height. 10♦7: Complete Part 1. Ignore questions about Adult data. Instead of this Part 2 do the Part 2 activity "Measuring Angles Perimeter and Area" from last unit Lesson 5♦10. Assign Home Link from both lessons 10♦6 & 10♦7.			2 Days Total. Provide sticky notes for data collection.	Explain the meaning of median. PE 4.4.E	
6♦1	3.5.E Construct and analyze pictographs, frequency tables, line plots, and bar graphs. 4.4.E Determine the median, mode, and range of a set of data and describe what each measure indicates about the data.	Record, organize, display and describe data using a line plot. PE 4.4.E & 3.5.E	Do Readiness Activity on TLG p383; "Reviewing Data Landmarks".	minimum, maximum, mode, median, landmark, line plot		Create Number lines for data collection (see TLG p378). Familiarize yourself with the rounding feature on your students' calculators.	Display data on a line plot and discuss the data's organization. PE 3.5.E	TLG p382, "If you extended the top number line in No. 1, would 100 be one of the missing numbers? Explain."
6♦2	2.3.C Measure length to the nearest whole unit in both metric and U.S. customary units. 4.4.H Display the results of probability experiments and interpret the results. 6.3.F Determine the experimental probability of a simple event using data collected in an experiment.	Collect data by playing a game to determine if it is 'fair'. (see 6♦6) PE 4.4.H	Students can use their arm span measurements from the 3 rd grade lessons above for problem #7, SMJ p169 (fathom).	fathom, cubit, fair game	P1 <i>Finish First</i> SMJ p170 PE 6.3.F	Prepare recording posters for <i>Finish First</i> Activity (see TLG p384 & 387)	Use linear measuring tools to measure to the nearest centimeter and ¼ inch. PE 2.3.▲	
6♦3	4.4.E Determine the median, mode, and range of a set of data and describe what each measure indicates about the data. 5.5.B Determine and interpret the mean of a small data set of whole numbers. 6.3.F Determine the experimental probability of a simple event using data collected in an experiment.	Collect, organize, and interpret data. PE 4.4.E & 5.5.B	Combine Lessons into 1 day: Touch & Go on Stem-and-Leaf (7 th grade standard). Students may use a line plot as an alternative. Keep the focus on mean, median and mode.	span, normal span, great span, stem-and-leaf plot, stem, leaf, angle of separation	P2 <i>Finish First</i> SMJ p171 PE 6.3.F	Create poster of stem-and-leaf plot from SMJ p173.	Understand the structure of stem-and-leaf plots. PE 7.4.D	
6♦4	3.5.E Construct and analyze pictographs, frequency tables, line plots, and bar graphs. 4.5.H Analyze and evaluate whether a solution is reasonable, is mathematically correct, and answers the question. 6.3.F Determine the experimental probability of a simple event using data collected in an experiment.	Predict reasonable range for a set of data to identify line plot. PE 4.5.H & 3.5.E				P2 <i>Finish First</i> SMJ p171 PE 6.3.F	Math Message, MM p163, 1 per 2 students, cut apart. Part 3 (R), MM p429, cut into 1 X 9 inch strips, 1 per student.	Interpret data displayed in line plots. PE 4.5.H & 3.5.E
6♦5	6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number. 6.3.F Determine the experimental probability of a simple event using data collected in an experiment.	Determine the reliability of data as it relates to sample size. PE 6.3.F & 6.3.C	Optional: Part 1, "Sample Size and Sound Conclusions". This will be covered in Middle School. Do Part 2. Plan to spend extra time discussing the Study Link on the next day.	sample, population	P2 <i>Finish First</i> SMJ p171 PE 6.3.F	See TLG p400. Prepare class circle graph.	Understand the concept of percent. PE 6.3.C	

6↔6	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>4.4.H Display the results of probability experiments and interpret the results.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Organize and interpret data from a large sampling. (<i>Finish First</i> game started in 6↔2) PE 4.4.H</p>		<p>sample, survey, population, frequency table</p>	<p><i>P2 Frac-Tac-Toe</i>: SRB p309-310, MM p472&474 PE 4.2.D & 6.3.C▼</p>	<p>For Part 1, update your <i>Finish First</i> data charts. See TLG p405 for suggestions on how students can collect and analyze their own data. (then, allow one more day for lesson)</p>	<p>Name fraction-decimal equivalents. PE 4.2.D▲</p>	
6↔7	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>5.6.I Summarize mathematical information, draw conclusions, and explain reasoning.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Read and analyze data from a contour map. (<i>American Tour Project</i>) PE 5.6.I</p>	<p>Optional: Part 1 on maps. Do all of Part 2.</p>	<p>contour map, climate, precipitation, map legend (map key), contour line</p>		<p>Part 3 (EP), collect maps with contour lines for temp, moisture, etc.</p>	<p>Rename fractions as decimals and percents. PE 4.2.D▲ & 6.3.C</p>	
6↔C	<p>5.2.A Represent addition and subtraction of fractions and mixed numbers using visual and numerical models, and connect the representation to the related equation.</p>	<p>Use pattern blocks to model addition and subtraction of fractions. PE 5.2.A</p>	<p>Supplemental Lesson to support addition and subtraction of fractions. Gr3 California Project #9: Adding and Subtracting Fractions.</p>			<p>2 Day Lesson</p>	<p>Use pattern blocks to solve fraction addition problems. PE 5.2.A</p>	
6↔8	<p>4.1.B Identify factors and multiples of a number.</p> <p>5.2.A Represent addition and subtraction of fractions and mixed numbers using visual and numerical models, and connect the representation to the related equation.</p> <p>5.5.A Classify numbers as prime or composite.</p>	<p>Use a fraction strips to add and subtract fractions. PE 5.2.A</p>	<p>Do “Using Fraction Strips” on TLG p 421. All slide rule activities are optional. Do all of Part 2.</p>	<p>slide rule, slider, holder</p>	<p><i>P2 Divisibility Dash</i>: SRB p302 PE 5.5.A & 4.1.B</p>	<p>For Part 1, prepare a sample slide rule (SMJ 2, Activity Sheet 5), review how it is used (TLG p419-20 & SMJ p191). Save slide rules for Unit 7. Use MM p431 for teacher demo.</p>	<p>Identify fractions of a region and add and subtract fractions with a visual model. PE 5.2.A</p>	
6↔9	<p>4.1.B Identify factors and multiples of a number.</p> <p>5.2.A Represent addition and subtraction of fractions and mixed numbers using visual and numerical models, and connect the representation to the related equation.</p> <p>5.2.C Given two fractions with unlike denominators, rewrite the fractions with a common denominator.</p>	<p>Share and justify equivalent fraction strategies to find common denominators. PE 5.2.C</p>	<p>Use online virtual manipulatives site to model “Fraction Equivalents”: http://nlvm.usu.edu/en/nav/category_g_2_t_1.html Extra practice with elapsed time activity TLG p428 is great.</p>	<p>common denominator, unlike denominators</p>	<p><i>P2 Fraction Capture</i>: SMJ p198, MM p460 PE 5.5.A & 4.1.B</p>	<p>Display Multiplication Table poster.</p>	<p>Use a visual model to add and subtract fractions with unlike denominators. PE 5.2.A</p>	<p>TLG p427, “Explain your answer to the question in No. 3 and how you chose the values for the data set.”</p>
6↔10	<p>5.2.C Given two fractions with unlike denominators, rewrite the fractions with a common denominator.</p>	<p>Use multiples and factors to find common denominators. PE 5.2.C</p>		<p>quick common denominator, simplest form</p>			<p>Understand fraction strips. PE 5.2.C</p>	<p>TLG p432, “Using 9³ from No. 3 as an example, explain the words <u>base</u> and <u>exponent</u>.”</p>

Unit 7: Exponents and Negative Numbers								
Overview: To understand the conventions associated with exponents; to avoid ambiguities in the interpretation of number sentences; to recognize the need to use negative numbers in certain situations.								
Big Ideas		Equivalence 1: Any number, numerical expression or equation can be represented in multiple ways. Number Relationships: There is an inverse relationship between addition and subtraction operations and between multiplication and division operations when using rational numbers.						
Performance Expectation		Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
7♦1	4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts. 7.5.B Write the prime factorization of whole numbers greater than 1, using exponents when appropriate.	Describe the number patterns inherent to exponential notation. PE 7.5.B▼	Exponential and Scientific notation are middle school standards. Skip most of lessons 7♦1, 7♦2 & 7♦3. Play <i>First to 100</i> in lesson 7♦2. Math Boxes: all in 7♦1 and 7♦3 and only problems #1 & #3 in 7♦2.	standard notation, exponential notation, base, exponent, factor, power of a number	P1 <i>Exponent Ball</i> . SRB p305, MM p451 PE 7.5.B	Prepare class chart of table on SMJ, p209, Problem 2; Exponential Notation. See TLG p542 –43.	Accurately identify and correct mistakes in exponential notation. PE 4.1.A▲	TLG p545, “Explain how to use division to find equivalent fractions.” (No. 1)
	7♦2	4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts. 4.1.D Multiply by 10, 100, and 1,000. 5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved. 7.5.B Write the prime factorization of whole numbers greater than 1, using exponents when appropriate.		Describe the number patterns inherent to powers of 10. PE 7.5.B▼ & 4.1.D	number-and-word notation, power of 10	P2 <i>First to 100</i> . SRB p308, MM p456-458 PE 5.4.C	For part 1, prepare class place-value chart of SMJ p212. MM p433 one per 2 students plus one for Instruction. Save for Lesson 7♦3. For Part 3 (E), extend chart to include negative powers of 10.	Write equivalent names for powers of 10. PE 4.1.A▲
7♦3	7.5.B Write the prime factorization of whole numbers greater than 1, using exponents when appropriate. 8.4.A Represent numbers in scientific notation, and translate numbers written in scientific notation into standard form. 8.4.C Evaluate numerical expressions involving non-negative integer exponents using the laws of exponents and the order of operations.	Translate scientific notation to whole numbers with zeros after the lead digit. PE 8.4.A		expanded notation, scientific notation	P1 <i>Scientific Notation Toss</i> . SRB p329 PE 7.5.B & 8.4.C		Accurately complete a table using place value to translate numbers from scientific notation to standard notation. PE 8.4.A	
7♦4	5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	Solve problems involving parentheses and nested parentheses. PE 5.4.C	Introduce language “Order of Operations” See Teacher Reference. Manual p102. Start lesson with Readiness Activity, TLG p560.	expression, ambiguous, nested parentheses	P2 <i>Name That Number</i> . SRB p325 PE 5.4.C	For Lesson 7♦6, Part 3 (R), collect newspapers and magazines that contain line graphs.	Write expressions containing parentheses to represent a number story. PE 5.4.C	TLG p560, “Use your solution for No. 2 to explain how to read a stem-and-leaf plot.”
7♦5	4.2.B Read, write, compare, and order decimals through hundredths. 6.2.D Apply the commutative, associative, and distributive properties, and use the order of operations to evaluate mathematical expressions.	Use order of operations to solve problems when parentheses are missing. PE 6.2.D▼	Spend extra time on Math Message and focus on parentheses discussion. Although some of this work is addressing a 6 th grade PE, it is appropriate for students to use a reference chart that lists the Order of Operations in order to do this work.	order of operations		Prepare class chart of abbreviated rules for order of operations (PEMDAS). See TLG p564.	Correctly place relations symbols to compare decimals. PE 4.2.B▲	
7♦6	5.2.E Fluently and accurately add and subtract fractions, including mixed numbers. 5.5.C Construct and interpret line graphs.	Use a line graph to organize and interpret data. (America Tour Project) PE 5.5.C	Instead of Math Boxes, do the Extra Practice activity, “Graphing Sets of data on a Line Graph”, TLG p572 to support PE 5.5.C .	axis, Venn diagram, line graph, trend		Part 3 (R) uses newspapers and magazines that contain line graphs.	Add and subtract fractions with like and unlike denominators. PE 5.2.E	TLG p571, “Explain how to use your Geometry Template to draw the angle in No. 3.”

7♦7	<p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>6.1.A Compare and order non-negative fractions, decimals, and integers using the number line, lists, and the symbols $<$, $>$, or $=$.</p>	Use a number line to compare and order integers (positive and negative numbers) PE 6.1.A	<p>Work involving integers is will be covered in middle school. Skip most of lessons 7♦7 through 7♦11. Play <i>Name That Number & High-Number Toss</i> (Decimals). Assign these math boxes sometime during Unit 8. Skip problems for content which you have not covered.</p>	negative number	P2 <i>Name That Number</i> : SRB p325, MM p490 PE 5.4.C	For Part 1, draw a number line from -8 to 8 on class chart. For Part 2 game, MM p490, 1 per 2 students, cut apart.	Use the order of operations to write number sentences that demonstrate accuracy and flexibility. PE 5.4.C	TLG p576, "Explain how you identified the missing numbers in No. 4a."
7♦8	<p>7.1.B Represent addition, subtraction, multiplication, and division of positive and negative integers visually and numerically.</p>	Use two color counters to solve problems involving the addition of integers. PE 7.1.B		account balance, debt, in the black, in the red	P3R 500: SMJ p235; P3E <i>Credits/Debits Game</i> : SRB p301, MM p450 PE 7.1.B▼	Math Message: MM p432, 1 per student, and save for Part 3 (R) and Lesson 7♦9. For Part 1, two color counters are helpful for modeling. Prepare class chart of function machine and table, TLG p582.	Model problems by pairing positive counters with negative counters to find the answers. PE 7.1.B	
7♦9	<p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>4.2.B Read, write, compare, and order decimals through hundredths.</p> <p>7.1.B Represent addition, subtraction, multiplication, and division of positive and negative integers visually and numerically.</p>	Use two color counters to solve problems involving the addition and subtraction of integers. PE 7.1.B		slide rule, holder, slider	P2 <i>High-Number Toss</i> (Decimals): SRB p321, MM p487 PE 4.2.A		Compare decimals. PE 4.2.B▲	
7♦10	<p>4.1.E Compare the values represented by digits in whole numbers using place value.</p> <p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>5.4.A Describe and create a rule for numerical and geometric patterns and extend the patterns.</p> <p>7.1.B Represent addition, subtraction, multiplication, and division of positive and negative integers visually and numerically.</p>	Use paper slide rules to solve problems involving addition and subtraction of integers. PE 7.1.B		negative number, opposite, change-sign key (-) or (+/-)	P2 <i>Top-It Games</i> (with + & -): SRB p335-6, MM p493 PE 4.2.A▲ & 4.1.E	Part 1, students use their slide rules from Lesson 6♦8. If more are needed, use MM p211. See notes in TLG, bottom of p590. Part 3 (E), MM p213, 1 per 2 students.	Identify and extend number patterns. PE 5.4.A▲	
7♦11	<p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>4.2.G Simplify fractions using common factors.</p> <p>7.1.B Represent addition, subtraction, multiplication, and division of positive and negative integers visually and numerically.</p>	Use calculators to solve problems involving the addition of integers. PE 7.1.B			P3E <i>Broken Calculator</i> : MM p216 PE 7.1.B	Before instruction, practice using your students' calculators to solve SMJ activities (p244-5) to determine correct key sequences.	Accurately convert improper fractions to whole numbers or mixed numbers in simplest form. PE 4.2.C & 4.2.G	TLG p599, "Explain your strategy for solving the open number sentences in No. 2a."

Unit 8: Fractions and Ratios								
Overview: To rename fractions as equivalent fractions; to use equivalent names for fractions and mixed numbers to perform operations; to introduce algorithms for the multiplication of fractions and mixed numbers; to practice estimating and calculating a percent of a number.								
Big Ideas	Equivalence 1: Any number, numerical expression or equation can be represented in multiple ways. Number 2: A fraction represents a comparison of part to the whole (region, set, segment).							
	Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
12♦1	<p>5.2.D Determine the greatest common factor and the least common multiple of two or more whole numbers.</p> <p>5.5.A Classify numbers as prime or composite.</p> <p>7.5.B Write the prime factorization of whole numbers greater than 1, using exponents when appropriate.</p>	<p>Find greatest common factors and least common multiples using factor strings and trees. PE 5.2.D & 7.5.B▼</p>	<p>Touch & Go: Note that this lesson will be review of what students have covered in Prime Time. Take this opportunity to make sure students have mastered PE 5.2.D.</p>		<p>P2 <i>Factor Captor</i>. SRB p306, MM p455 PE 5.5.A</p>		<p>Use factor trees to factor numbers and identify prime factorization. PE 7.5.B▼</p>	<p>TLG p918, “Explain your solution strategy for Math Boxes No. 2.”</p>
8♦1	<p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =.</p> <p>5.2.C Given two fractions with unlike denominators, rewrite the fractions with a common denominator.</p>	<p>Use common denominators to compare fractions. PE 5.2.C & 4.2.E</p>		<p>Quick Common Denominator (QCD)</p>	<p>P1 <i>Build It</i>. SRB p300, MM p446-7 PE 4.2.E</p>	<p>Before Part 1, have students cut out 16 fraction cards, MM p446, on cardstock. Prepare MM p447, 1 per 2 students, cut apart. For Part 3 (R), hang string, see TLG p623.</p>	<p>Compare fractions and indicate whether a fraction is closest to 0, 1/2, 1, 1 1/2, or 2. PE 4.2.E</p>	
8♦2	<p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>4.2.G Simplify fractions using common factors.</p> <p>5.2.E Fluently and accurately add and subtract fractions, including mixed numbers.</p>	<p>Use conversion strategies to simplify adding mixed fractions with like and unlike denominators. PE 5.2.E</p>	<p>Use Singapore Math Grade 4 Extra Practice Exercise 7 on pp. 17-18 to reinforce PE 5.2.E.</p>		<p>P3EP <i>Fraction Capture</i>. SMJ p198, MM p460 PE 4.2.C</p>		<p>Rename fractions to have common denominators and to be in simplest form. PE 5.2.E & 4.2.G</p>	<p>TLG p628, “Explain your strategy for finding the values of the variables in No. 5.”</p>
8♦3	<p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =.</p> <p>5.2.E Fluently and accurately add and subtract fractions, including mixed numbers.</p> <p>6.1.A Compare and order non-negative fractions, decimals, and integers using the number line, lists, and the symbols <, >, or =.</p>	<p>Use conversion strategies to simplify subtracting mixed fractions with like and unlike denominators. PE 5.2.E</p>	<p>Use Singapore Math Grade 4 Extra Practice Exercise 8 on pp. 19-20 to reinforce PE 5.2.E.</p>		<p>P2 <i>Mixed Number Spin</i>. SMJ p255, MM p488-9 PE 6.1.A & 5.2.E</p>		<p>Add, subtract, and compare mixed numbers. PE 5.2.E & 4.2.E</p>	<p>TLG p634, “Explain one advantage and one disadvantage to using number and word notation in No 2.”</p>
8♦4	<p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =.</p> <p>5.2.E Fluently and accurately add and subtract fractions, including mixed numbers.</p> <p>5.2.G Estimate sums and differences of fractions, mixed numbers, and decimals to approximate solutions to problems and determine reasonableness of answers.</p> <p>5.2.H Solve single- / multi-step word problems involving addition and subtraction of whole numbers, fractions (including mixed numbers), and decimals, and verify the solutions.</p>	<p>Estimate sums of fractions and mixed numbers with like and unlike denominators. PE 5.2.G</p>	<p>The flow chart in the Readiness activity is a great way to illustrate the process of finding common denominators. Use Singapore Math Grade 4 Extra Practice Exercise 9-10 on pp. 21-25 to address PE 5.2.E and 5.2.H.</p>		<p>P1 <i>Fraction Action, Fraction Friction</i>. SRB p312, MM p459 PE 5.2.G</p>	<p>Review key sequences for your students’ calculators before lesson. See TLG p636. Prepare MM p227, one copy for teaching master.</p>	<p>Identify the least, middle, and greatest fractions and place one or more fractions in proximity to each of these three. PE 4.2.E</p>	

8↔5 & 8↔6	<p>5.2.E Fluently and accurately add and subtract fractions, including mixed numbers.</p> <p>6.1.A Compare and order non-negative fractions, decimals, and integers using the number line, lists, and the symbols $<$, $>$, or $=$.</p> <p>6.1.B Represent multiplication and division of non-negative fractions and decimals using area models and the number line, and connect each representation to the related equation.</p>	Use area model for multiplication of fractions. PE 6.1.B		vertical, horizontal	<i>P2 Fraction Spin</i> . SMJ p262, MM p471 PE 5.2.E & 6.1.A	For Part 1, MM p434, one copy for teaching master. Prepare class chart of labeled diagram, TLG p646. Students will need 8 ½ X 11 paper. Part 2, <i>Adjusting the Activity</i> , students will need 30 index cards per 2 students, cut in half vertically.	Demonstrate an understanding of fractional parts on a number line. PE 6.1.B	TLG p647, "Write one of the false number sentences from No. 2. Then write it correctly so it is true, and explain your solution."
	area model	For Part 1, MM p231, 1 copy for teaching master which is the same as SMJ p265.		Use and accurately sketch the area model for fraction multiplication. PE 6.1.B				
8↔7	<p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>6.1.B Represent multiplication and division of non-negative fractions and decimals using area models and the number line, and connect each representation to the related equation.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	Use area model for multiplication of fractions and whole numbers. PE 6.1.B	Multiplication of fractions will be extensively covered in Middle School. Skip all these lessons. Look at the Math Boxes pages for these lessons and select a few to keep as reinforcement of concepts for students that need extra support.		<i>P2 Name That Number</i> . SRB p325 PE 5.4.C		Convert fractions to decimals and percents and demonstrate an understanding of the role of the numerator and the denominator. PE 6.3.C	
8↔8	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>6.1.B Represent multiplication and division of non-negative fractions and decimals using area models and the number line, and connect each representation to the related equation.</p> <p>6.1.H Solve single- and multi-step word problems involving operations with fractions and decimals and verify the solutions.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	Use partial products diagram to solve for multiplication of mixed numbers. PE 6.1.B			<i>P3EP Frac-Tac-Toe</i> . SRB p309-311, MM p472-484 PE 4.2.D & 6.3.C▼	For Study Link follow-up, prepare class chart of several "What's My Rule?" rule boxes and tables.	Multiply mixed numbers and accurately describe the method used. PE 6.1.H	TLG p662, "Explain how to use the division rule for finding equivalent fractions to solve No. 4b."
8↔9	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>4.2.G Simplify fractions using common factors.</p> <p>6.3.D Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.</p>	Share and justify strategies to estimate discounts (percents off of prices). PE 6.3.D	Skip lesson. Look at the Math Boxes pages for these lessons and select a few to keep as reinforcement of concepts for students that need extra support.	discount		Before Part 1, practice using the percent key on your students' calculators.	Convert between fractions, decimals, and percents and express fractions in simplest form. PE 4.2.D▲ & 4.2.G	TLG p668, "Explain how to rename an improper fraction as a mixed number. Use No. 1a as an example."
8↔10	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>5.5.A Classify numbers as prime or composite.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	Share strategies to solve problems for fractions of a set. PE 3.3.A▲ & 6.3.C	Modification: Math Message activity SMJ p280 should not just be a warm-up but the focus of the lesson. Students should try to solve this using manipulatives, diagrams, tables and any other strategies and then share and discuss these strategies whole group. Skip formulas involving multiplications of fractions or percents since they go beyond the scope of PE 5.4.C . SMJ p281 problem 1 can be done as partners but problems 2-4 should be touch & go and presented whole group (use calculators). Skip "Using Unit Percents to Find the Whole" on TLG p671.	unit fraction, unit percent	<i>P2 Factor Captor</i> . SRB p396, MM p454-455 PE 5.5.A	For Part 1, MM p435, one copy for teaching master.	Use unit fractions and unit percents to solve problems correctly. PE 3.3.A▲ , 5.4.C & 6.3.C	

8♦11	<p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>5.2.E Fluently and accurately add and subtract fractions, including mixed numbers.</p> <p>6.3.D Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.</p>	<p>Calculate the percent of a number. (American Tour Project) 6.3.D</p>	<p>Skip all of Part 1 in both lessons. Play <i>Fraction Capture</i> from 8♦11 and <i>Build-It</i> from the Readiness Activity in 8♦12. Do all Math Boxes for both lessons.</p>		<p>P2 <i>Fraction Capture</i>: SMJ p198, MM p460-461 PE 4.2.C</p>	<p>For Part 1, prepare: MM p244 or make a poster; prepare large display of chart in SMJ p286. Find or estimate population of your school's community. Display report on a government survey. See TLG p674 for additional details.</p>	<p>Use equivalent fractions to find pairs of fractions with sums greater than $\frac{1}{2}$. PE 5.2.E</p>	
8♦12	<p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols $<$, $>$, or $=$.</p> <p>6.1.D Fluently and accurately multiply and divide non-negative fractions and explain the inverse relationship between multiplication and division with fractions.</p>	<p>Use pattern blocks to find the number of fractional parts in whole numbers. PE 6.1.D▼</p>			<p>P3R <i>Build-It</i>: SRB p300, MM p446-447 PE 4.2.E</p>	<p>Before Part 3 (E), practice activity with your students' calculators to determine key sequences.</p>	<p>Rename a mixed number as a fraction, recognize the common denominators in a problem, and divide the numerators to find an answer. PE 4.2.C & 6.1.D▼</p>	<p>TLG p684, "Explain your strategy for finding the whole set in No. 1. Choose one of the sets in the problem to use as an example."</p>

Unit 9: Coordinates, Area, Volume, and Capacity								
Overview: To work with coordinate graphs; to extend area concepts; and to develop a formula for volume and consider capacity relationships.								
Big Ideas		Measurement & Geometry: Objects and two-dimensional shapes can be quantified, classified, described and analyzed by their attributes and by using unit amounts. Transformations: Objects in space can be rotated, translated, reflected and scaled in infinite ways and those transformations can be described mathematically.						
Performance Expectation		Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
9♦A - 9♦D	3.3.B Compare and order fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12. 3.4.B Identify and sketch right angles. 4.3.A Determine congruence of two-dimensional figures. 4.4.D Graph and identify points in the first quadrant of the coordinate plane using ordered pairs. 5.3.B Identify, sketch, and measure acute, right, and obtuse angles. 5.3.H Determine the number and location of lines of symmetry in triangles and quadrilaterals. 8.3.D Describe different methods of selecting statistical samples and analyze the strengths and weaknesses of each method.	Use a variety of tools and strategies to determine lines of reflection and lines of symmetry for various figures.	Supplemental Lessons: Grade 4 Lessons 10♦1, 10♦2, 10♦3 & 10♦4: EDM finishes addressing symmetry in 4 th grade. To support this standards in 5 th use these lessons. Do all of Part 1 and 2 for all lessons. Skip only Part 2 from lesson 10♦3 4 Days Total for all lessons.	transparent mirror, recessed, image, preimage, congruent reflection, line of reflection line of symmetry, symmetric, rotation (turn) symmetry	10♦1: P2 <i>Over and Up Squares</i> : SRB p257, MM p494 PE 4.4.D ; 10♦2: P1 <i>Dart Game</i> :7; P1 <i>Pocket-Billiards Game</i> : PE 4.3.A ; P2 <i>Angle Tangle</i> : SRB p230, MM p457 PE 3.4.B, 5.3.B	10♦1: Part 1 uses transparent mirrors for Math Message. Part 3 (E) uses the book "Shadows and Reflections." 10♦2: Part 3 (R) uses supplies and space for painting. Planning Ahead: For Lesson 10♦4, Part 3 (ELL), collect pictures of symmetric objects. See TLG p804.	See individual lessons for specifics. Standards align as follows: 10♦1: PE 4.4.D 10♦2: PE 3.3.B 10♦3: PE 4.3.A 10♦4: PE 5.3.H	10♦1: TLG p797, "What strategy did you use to insert the decimal point in No. 4c." 10♦3: TLG p808, "How did you choose the weight for the cat in No. 5."
	4.4.D Graph and identify points in the first quadrant of the coordinate plane using ordered pairs. 8.4.A Represent numbers in scientific notation, and translate numbers written in scientific notation into standard form.	Use ordered pairs of numbers to name, locate, and plot points in the first quadrant of a coordinate grid. PE 4.4.D	Optional: Fun activities but mostly review of 4 th grade standards.	coordinate grid, axis, origin, ordered pair of numbers, vertical axis, horizontal axis, coordinate	P1 <i>Hidden Treasure</i> : SRB p319, MM p485 PE 4.4.D	Part 1 uses Teaching Masters, MM p437, 438, & 485 (for extra Hidden Treasures game boards).	Translate numbers written in scientific notation into standard notation and number-and-word notation. PE 8.4.A	TLG p708, "Explain how you solved No. 2d. How might you check your answer?"
	4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line. 4.4.D Graph and identify points in the first quadrant of the coordinate plane using ordered pairs. 8.2.D Represent and explain the effect of one or more translations, rotations, reflections, or dilations (centered at the origin) of a geometric figure on the coordinate plane.	Use patterns of changes for numbers within ordered pairs to scale, translate and reflect plane figures on a coordinate grid. PE 4.4.D▲ & 8.2.D▼	Optional: Transformations and working on 4 quadrants of coordinate grids are Middle School standards.	ordered number pair, coordinates		Part 1, uses Teaching Master, MM p260. Planning Ahead for Lesson 9♦4, see TLG p715.	Plot ordered number pairs and identify decimals on a number line. PE 4.4.D▲ & 4.2.A	TLG p713, "Explain your solution strategy for completing the table and finding the rule for No. 6."
	4.3.C Determine the perimeter and area of a rectangle using formulas, and explain why the formulas work. 4.3.D Determine the areas of figures that can be broken down into rectangles. 4.3.F Solve single- and multi-step word problems involving perimeters and areas of rectangles and verify the solutions.	Use area formula to determine base, height or area of a rectangle when one measurement is missing. PE 4.3.C▲ & 4.3.F	Ask students to calculate the perimeter on p.305 as well as area to reinforce PE 4.3.C .	area, square units, base, height, formula, variable	P2 <i>Hidden Treasure</i> : SRB p319, MM p486 & SMJ p302 PE 4.4.D	Part 2, MM p485, additional gameboard copies. Part 3, MM p262, 1 per 2 students, cut in half.	Plot points on a coordinate grid and correctly graph transformations. PE 4.4.D	
9♦4					Part 1, uses Teaching Master, MM p436. See TLG p722 for modeling suggestions, Problem 2, SMJ2 p305.	Calculate and accurately explain how to find area. PE 4.3.D		

9♦E & 9♦F	5.3.D Determine the formula for the area of a parallelogram by relating it to the area of a rectangle. 5.3.E Determine the formula for the area of a triangle by relating it to the area of a parallelogram.	Use grid paper cut outs to develop a formula for area of a parallelogram. PE 5.3.D	Supplemental Lessons: Grade 4 Lessons 8♦6 & Lesson 8♦7: To support conceptual development of areas of parallelograms and Triangles do Part 1 in both lessons. Part 2 is optional.	base, height, perpendicular	P2 <i>Fraction Of</i> : SRB p244, MM p477-80 PE 6.1.D	For Part 1, 2 short straws (equal length), 2 long straws (equal length) and 4 twist-ties per student. Have students complete MM p262 before Lesson 9♦1.	Solve fraction addition and subtraction problems PE 5.2.E.	
		Use previous proofs for area of parallelograms to develop formula for area of triangle. PE 5.3.E		equilateral triangle, isosceles triangle, base, height	P3E <i>Rugs and Fences</i> : SRB p260, MM p498-502 PE 4.3.B, 4.3.C	For Part 3 (EP), MM p498-501 <i>Rugs and Fences</i> cards on cardstock, cut apart. Also used in Lesson 9♦2.	Describe a strategy for finding and comparing the areas of a square and a polygon. PE 5.3.F	TLG p697, "For Problem 4, write two probability questions for which the correct answer would be D – 210 times."
9♦5	4.2.D Convert a decimal to a fraction and vice versa and visually represent the number. 4.3.A Determine congruence of two-dimensional figures. 5.3.E Determine the formula for the area of a triangle by relating it to the area of a parallelogram. 6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.	Use grid paper to share and justify strategies for determining the area of triangles and parallelograms. PE 5.3.E	This lesson shows an additional way to develop the area formula for triangles relating it strictly to rectangles and is a good follow-up to the 4 th grade lessons.	personal references, rectangle method	P2 <i>Frac-Tac-Toe</i> : SRB p309-311, MM p472-84 PE 4.2.D & 6.3.C▼	Small groups solve Math Message, SMJ2 p308. Part 3, (EP) uses the book, "Spaghetti and Meatballs for All."	Draw a line segment congruent to a given line segment and explain why the two line segments are congruent. PE 4.3.A	
9♦6	5.2.G Estimate sums and differences of fractions, mixed numbers, and decimals to approximate solutions to problems and determine reasonableness of answers. 5.3.D Determine the formula for the area of a parallelogram by relating it to the area of a rectangle. 5.3.E Determine the formula for the area of a triangle by relating it to the area of a parallelogram.	Use strategies shared in lesson 9♦5 to develop formulas for the areas of triangles and parallelograms. PE 5.3.D & 5.3.E		base, height, perpendicular, altitude	P2 <i>Fraction Action, Fraction Friction</i> : SRB p312, MM p459 PE 5.2.G	For 9♦7, collect world maps or globes and display your class Probability Meter (with a sticky note).	Write both the equation and word sentence for the area formulas for triangles and parallelograms. PE 5.3.D & 5.3.E	TLG p738, "Choose a transformation. Then explain what rule you would use to change the ordered pairs in No. 1 to transform the figure."
9♦7	3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line. 4.3.B Determine the approximate area of a figure using square units.	Use sampling of map coordinates to estimate the percentage of surface area. PE 4.3.B▲	Optional: Both Parts 1 and 2.	latitude, longitude		For Part 1, prepare MM p274-5, cut into squares and placed in 2 containers. For Part 3, (E), sketch a floor map of school (ground level) and make copies.	Solve fraction-of problems and identify the numbers that represent the unit fraction of a set. PE 3.3.A▲	TLG p744, "Explain your method of remembering the steps for plotting ordered number pairs on a coordinate grid."
9♦8	5.2.D Determine the greatest common factor and the least common multiple of two or more whole numbers. 6.4.E Determine the surface area and volume of rectangular prisms using appropriate formulas and explain why the formulas work.	Use centimeter cubes to develop a formula for the volume of rectangular prisms. PE 6.4.E▼	Skip Part 1 for both lessons. Volume of Prisms will be covered in Middle School. Play <i>Polygon Capture</i> from 9♦9. Do all Math Boxes from 9♦8 and all Math Boxes from 9♦9 except for problem #1	volume, cubic unit, rectangular prism, face, base, height		For Part 1, make models of shapes from SMJ, Activity Sheet 6. Planning Ahead: For 9♦9, you will need foam core. See TLG p 753 for cutting directions.	Find common denominators and correctly identify the least common denominators. PE 5.2.D	
9♦9	3.4.A Identify and sketch parallel, intersecting, and perpendicular lines and line segments. 3.4.C Identify and describe special types of quadrilaterals. 5.3.B Identify, sketch, and measure acute, right, and obtuse angles. 5.3.C Identify, describe, and classify triangles by angle measure and number of congruent sides. 6.4.E Determine the surface area and volume of rectangular prisms using appropriate formulas and explain why the formulas work.	Use foam core shapes to verify formula for volume of prisms. PE 6.4.E▲			prism, face	P2 <i>Polygon Capture</i> : SRB p328, MM p494-7 PE 5.3.C & 3.4.A	For Part 1, prepare foam core using templates on MM p282-3. Planning Ahead: See 9♦10, TLG p760; Advanced Prep directions.	Correctly match polygons with their properties. PE 5.3.B, 3.4.A & 3.4.C
9♦10	3.5.D Estimate, measure, and compare capacity using appropriate-sized U.S. customary and metric units. 6.4.E Determine the surface area and volume of rectangular prisms using appropriate formulas and explain why the formulas work.	Use containers and base-ten blocks to demonstrate the connection between liters, milliliters and cubic centimeters. PE 3.5.D▲ & 6.4.E	Optional: Although the material in the lesson is presented in a way that is accessible for 5 th graders, the concepts will be covered in Middle School.	liter, capacity, quart, cup, milliliter, cubic centimeter, volume of a container		Gather measuring materials for Part 1. MM p436, multiple copies. Part 3 uses the book, "Mr. Archimedes Bath".	Explain the distinction between volume and capacity and provide examples by listing things measured in cubic centimeters and things measured in milliliters. PE 3.5.D▲ & 6.4.E	TLG p764, "Explain how you found the least common denominator for No. 3."

Unit 10: Using Data; Algebra Concepts and Skills								
Overview: To solve equations using a pan-balance model; to represent relationships as algebraic expressions; to generate input-output tables; to link data in tables to corresponding points on coordinate grids.								
Big Ideas		Data: Data can be collected, classified, analyzed & displayed using tables, charts & graphs. Patterns: Generalizations can be made and relationships can be described mathematically for situations that have numbers or objects that repeat in predictable ways. Properties: Properties of operations and equality are rules for arithmetic and algebra based on relationships that are always true for a given set of numbers.						
Performance Expectation		Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
10♦A - 10♦B	5.1.A Represent multi-digit division using place value models and connect the representation to the related equation. 5.1.C Fluently and accurately divide up to a four digit number by one- or two-digit divisors using the standard long-division algorithm. 5.1.F Solve single- and multi-step word problems involving multi-digit division and verify the solutions.	Use the Traditional Long Division Algorithm for division of whole numbers. PE 5.1.C	Supplemental Lessons to support long division using the traditional algorithm. Gr4 California Project #11 & Project #12: Long Division (Parts 1 & 2) Use these 2 projects to introduce the Traditional Long Division Algorithm sometime during unit 10. Provide various opportunities for practice before the end of the school year. Fluency using this particular algorithm supports future work in algebra.			2 Days Total Use index cards to create \$1, \$10, \$100 & \$1000 dollar bills.		
	10♦C	5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	Use pan-balance to demonstrate properties of equality. PE 5.4.C▼	Supplemental Lesson to support solving algebraic expressions. Gr4 California Project #10: Properties of Equality The activities in this project involving pattern block provide a more familiar model to establish the relationship between quantities in pan balance problems and will help clarify the activities in the next lessons. For the first activity in Part 1 “Exploring a Pan Balance” a Precision School Balance works much better than the Primary Balance. Model recording equations to match each situation. For example for the first bullet you start with one trapezoid (r) on each side, record $r = r$; then add 5 triangles (g) to each side and record $r + 5g = r + 5g$. Do all of Part 1		Gather pattern blocks made of like materials and of the same thickness. Wood is best. Balance (see comment)		
10♦2 & 10♦2	5.1.B Determine quotients for multiples of 10 and 100 by applying knowledge of place value and properties of operations. 5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	Use pan-balance diagrams to solve linear equations modeled as weights. PE 5.4.C▼	After completing the project your students should have enough background on how balanced equations relate to pan balances. Skip Math Message and “Demonstrating How to Solve Pan Balance Problems”. Start with problem #2 on SMJ p333. Do all of Part 2.	pan balance	P2 <i>First to 100</i> . SRB p308, MM p456-458 PE 5.4.C	Before Part 1, calibrate and practice with pan balance. (See TLG p784) Part 3 (E), collect appropriate year coins. Planning Ahead: For 10♦4, collect objects for museum.	Extend basic division facts. PE 5.1.B	TLG p788; “Explain how you would use a number line in No. 2a, $-7 + (-3) =$ “
			Avoid using actual pan balances in the Part 1 demonstration. Use diagrams like the ones shown on the right margin and the properties of equality learned in Project #10 to demonstrate solving the problems on TLG p793.			Part 1 uses 2 pan balances. (Directions are included in TLG for using one pan balance.)	Solve equations using a pan-balance model. PE 5.4.C▼	TLG p795, “Explain your solution strategy for No. 4a.”
10♦3	4.4.A Represent an unknown quantity in simple expressions, equations, and inequalities using letters, boxes, and other symbols. 5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.	Use variables in algebraic expressions (number models) to represent basic word problems. E 4.4.A		algebraic expression	P2 <i>Name that Number</i> . SRB p325 PE 5.4.C		Write algebraic expressions that model situations. PE 4.4.A	
10♦4 & 10♦5	5.4.A Describe and create a rule for numerical and geometric patterns and extend the patterns. 5.4.D Graph ordered pairs in the coordinate plane for two sets of data related by a linear rule and draw the line they determine. 6.2.E Solve one-step equations and verify solutions.	Represent an algebraic equation as a table and line graph. (American Tour Project) PE 5.4.D & 5.4.A		rate, formula, variable, line graph		For Part 1, allow use of calculators. Display examples for Rates and Ratios Museum.	Use table data to plot points on a graph. PE 5.4.D & 5.4.A	TLG p807, “In No. 2, explain how to determine whether 3,735 is divisible by 9 without actually dividing.”
				geyser, predict		Planning Ahead: See TLG p813 for extensive list of items needed for Unit 11.	Solve addition and subtraction open sentences containing negative and positive numbers. PE 6.2.E▲	

10♦6	<p>5.2.E Fluently and accurately add and subtract fractions, including mixed numbers.</p> <p>5.4.B Write a rule to describe the relationship between two sets of data that are linearly related.</p> <p>5.4.D Graph ordered pairs in the coordinate plane for two sets of data related by a linear rule and draw the line they determine.</p> <p>5.5.C Construct and interpret line graphs.</p> <p>6.1.A Compare and order non-negative fractions, decimals, and integers using the number line, lists, and the symbols $<$, $>$, or $=$.</p>	<p>Represent a rule as a table, algebraic equation and line graph. PE 5.4.B, 5.4.D</p>		<p>coordinates, ordered number pairs</p>	<p>P2 <i>Mixed-No. Spin or Fraction Spin</i>. SMJ p255, MM p470-1&488-9 PE 5.2.E & 6.1.A</p>	<p>For Part 3 (E), mark off a 5-meter course for a race. MM p439 1 per group. Planning Ahead: For 10♦8 & 10♦9, see TLG p819 for items needed.</p>	<p>Read and interpret graphs; be able to extend the lines to see an increase in time and distance. PE 5.5.C</p>	
10♦D	<p>5.5.C Construct and interpret line graphs.</p>	<p>Use data collected from pendulum swings to construct and interpret a line graph. PE 5.5.C</p>	<p>Supplemental Lesson to support line graphs. Gr5 Project #8: Pendulums TLG p462 or 986 Students have had few opportunities to construct their own line graphs with data that is not linearly related. Do the first 3 activities in Part 1 up through Graphing the Results. The last 2 activities investigating the arc and the weight of pendulums are great but do not support a specific math standard. Do as time allows.</p>	<p>Pendulum, complete swing</p>		<p>2 Day Lesson Per Small Group: string pendulum, meter stick, timer with seconds, 10 metal washers. See TLG p462 or 986 for details.</p>		
10♦7	<p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>5.5.C Construct and interpret line graphs.</p>	<p>Match mystery graphs with situations by interpreting lines on a line graph. PE 5.5.C</p>		<p>mystery graph</p>	<p>P2 <i>First to 100</i>. SRB p308, MM p456-8 PE 5.4.C</p>	<p>Planning Ahead: See Extensive prep needed for 10♦8, TLG p825. Tape is used.</p>	<p>Interpret line graphs. PE 5.5.C</p>	
10♦8	<p>6.3.E Identify the ratio of the circumference to the diameter of a circle as the constant pi, and recognize $22/7$ and 3.14 as common approximations of pi.</p> <p>4.3.F Solve single- and multi-step word problems involving perimeters and areas of rectangles and verify the solutions.</p>	<p>Use a sample of ratios between measured circumferences and diameters to approximate π. PE 6.3.E</p>	<p>Skip Part 1 and Part 2 in both lessons. 10♦8 and 10♦9. Conceptually developed and covered thoroughly in Grade 6. Optional: Play <i>First to 100</i> and select appropriate Math Boxes.</p>	<p>ratio, ratio comparison, diameter, circumference, radius, pi</p>		<p>See Advanced Prep, TLG p825. Part 3 (R) uses the book, <i>The Librarian who Measured the Earth</i>. Planning Ahead: save the cylindrical objects for 10♦9.</p>	<p>Explain and demonstrate accurate descriptions of area and perimeter. PE 4.3.F</p>	
10♦9	<p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>6.3.E Identify the ratio of the circumference to the diameter of a circle as the constant pi, and recognize $22/7$ and 3.14 as common approximations of pi.</p>	<p>Use a sample of ratios between counted squares inside circles (area) and the square of measured radii to approximate π. PE 6.3.E▲</p>				<p>P2 <i>First to 100</i>. SRB p308, MM p456-8 PE 5.4.C</p>	<p>Prepare chart of SMJ p365. Teaching Master of MM p314 & 436.</p>	<p>Replace variables in number sentences and solve problems correctly. PE 5.4.C</p>

Optional: Connected Mathematics 2: Prime Time (investigation 5) & Bits and Pieces I (Investigation 4)

PT♦5 & B1♦4	<p>4.1.A Quickly recall multiplication facts through 10 X 10 and the related division facts.</p> <p>4.1.B Identify factors and multiples of a number.</p> <p>5.2.D Determine the greatest common factor and the least common multiple of two or more whole numbers.</p> <p>5.5.A Classify numbers as prime or composite.</p> <p>4.2.A Represent decimals through hundredths with place value models, fraction equivalents, and the number line.</p> <p>4.2.C Convert a mixed number to a fraction and vice versa and visually represent the number.</p> <p>4.2.F Write a fraction equivalent to a given fraction.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Optional: Prime Time (Investigation 5) (3 Days): Prime Time's last investigation is a great, but time consuming, application of all the skills learned in that unit. Bits & Pieces I (Investigations 4) (5 Days): This section has a strong focus on the application of percents. Although not at grade standards, it may be appropriate for some students.</p>
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Unit 11: Volume								
Overview: To review properties of common 3-dimensional shapes; to develop formulas for these solids; to find volume by displacement.								
Big Ideas		Measurement & Geometry: Objects and two-dimensional shapes can be quantified, classified, described and analyzed by their attributes and by using unit amounts. Equivalence 1: Any number, numerical expression or equation can be represented in multiple ways.						
	Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
11♦1	5.3.C Identify, describe, and classify triangles by angle measure and number of congruent sides. 6.4.G Describe and sort polyhedra by their attributes: parallel faces, types of faces, number of faces, edges, and vertices.	Describe characteristics of various geometric solids. PE 6.4.G & 5.3.C	Skip all of Unit 11. This material will be covered in depth in Middle School. If time allows, go through the Math Boxes and select appropriate problems as review.	prism, pyramid, cylinder, cone, sphere, geometric solid, surface, edge, vertex, polyhedron		For each group: MM p323-326 (+1 for a model); set of objects (1 each of prism, pyramid, cylinder, cone, sphere); 1 each: 4-sided, 8-sided, 10-sided, 12-sided, 20-sided dice. Part 3, MM p329-330 on different-colored cardstock. Prepare labels on index cards of shape names.	Understand properties of geometric solids. PE 6.4.G	
11♦2	6.4.G Describe and sort polyhedra by their attributes: parallel faces, types of faces, number of faces, edges, and vertices.	Compare characteristics of various geometric solids. PE 6.4.G		base, apex	P1 3D <i>Shape Sort</i> : SRB p332, MM p505-7 PE 6.4.G	For Part 1, provide constructed geometric solids from 11♦1. Copy on cardstock MM p505-6 back-to-back, cut apart. Part 3 (R) uses the book, "Flatland". Planning Ahead: Collect cans for 11♦3, 1 per pair.	Demonstrate knowledge of the relationship between faces, vertices, and edges of prisms, pyramids, cylinders, and cones. PE 6.4.G	TLG p864, "Explain how to use a factor tree to find the prime factorization for a number. Use your factor tree from No. 5 as an example."
11♦3	6.4.E Determine the surface area and volume of rectangular prisms using appropriate formulas and explain why the formulas work. 7.3.A Determine the surface area and volume of cylinders using the appropriate formulas and explain why the formulas work.	Verify formula for the volume (cm ³) of a cylinder by comparing it to its measured capacity (mL). PE 7.3.A▼				Provide cans, see TLG p866 for directions to set up water stations for capacity measuring. Planning Ahead: See TLG p 871 for list of materials needed for 11♦5. Also, extensive prep. needed for 11♦4, see TLG p872.	Explain the differences and similarities between finding the volumes of cylinders and prisms. PE 7.3.A & 6.4.E	
11♦4	3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line. 3.4.A Identify and sketch parallel, intersecting, and perpendicular lines and line segments. 3.4.C Identify and describe special types of quadrilaterals. 5.3.A Classify quadrilaterals. 7.3.A Determine the surface area and volume of cylinders using the appropriate formulas and explain why the formulas work. 7.3.B Determine the volume of pyramids and cones using formulas.	Use dry fill to establish a volume relationship between pyramids and prisms and between cylinders and cones. PE 7.3.A & 7.3.B			P2 <i>Rugs and Fences</i> : SMJ p380, MM p498-501 PE 5.3.A & 3.4.A & 3.4.C	Copy MM p334 & 440 on cardstock and follow directions in TLG p872. Planning Ahead reminder: Have materials prepared for 11♦5, see TLG p871 & TLG p878.	Calculate the fraction of a whole and correctly identify each of the five values. PE 3.3.A▲	
11♦5	4.2.E Compare and order decimals and fractions (including mixed numbers) on the number line, in lists, and with the symbols <, >, or =. 7.3.D Solve single- and multi-step word problems involving surface area or volume and verify the solutions.	Use a calibrated container to determine volume of irregular objects through displacement of water. PE 7.3.D▲		displacement, calibrate		Follow directions in Lesson Commentary for calibration of bottles. See TLG p878 for materials. Part 3 (R) uses the book: "Who Sank the Boat?".	Compare fractions and demonstrate an understanding of the structure of fractions, finding equivalent fractions, and comparing fractions to a reference. PE 4.2.E	TLG p882, "Explain how you found the simplest form of 29/3 in No. 1."

11♦6	<p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>7.2.I Solve single- and multi-step problems involving conversions within or between measurement systems and verify the solutions.</p>	<p>Use the approximate conversion of one pint is about equal to one pound to convert between capacity and weight. PE 7.2.I</p>			<p><i>P2 Name That Number:</i> SRB p325, MM p490 PE 5.4.C</p>	<p>Organize workstations, and prepare models using MM p324 & p326. Part 1 requires a cardboard copy-paper box. See TLG p884. Save box for 11♦7.</p>	<p>Write number sentences and demonstrate appropriate use of the order of operations. PE 5.4.C</p>	<p>TLG p888, "Explain how you found the value for the width of the base of the rectangular prism in No. 2."</p>
11♦7	<p>5.3.F Determine the perimeters and areas of triangles and parallelograms.</p> <p>6.4.E Determine the surface area and volume of rectangular prisms using appropriate formulas and explain why the formulas work.</p> <p>6.4.F Determine the surface area of a pyramid.</p> <p>7.3.A Determine the surface area and volume of cylinders using the appropriate formulas and explain why the formulas work.</p>	<p>Apply knowledge of area of shapes (triangles, rectangles and circles) to calculate surface area of prisms, cylinders and pyramids. PE 6.4.E, 6.4.F & 7.3.A</p>		<p>surface area</p>			<p>Find the area of circles, triangles, and rectangles; use rectangle and triangle area formulas to find the surface area of prisms and cylinders. PE 5.3.F</p>	

Unit 12: Probability, Ratios, and Rates								
Overview: To find the greatest common factor and least common multiple of two numbers; to use ratios and ratio comparisons; to write number models for ratio number stories; to calculate rates from data.								
Big Ideas		Chance: The chance of an event occurring can be described numerically by a number between 0 and 1 inclusive and used to make predictions about events. Comparison: Numbers, expressions and measures can be compared by their relative values using symbols, words or numerical representations (fractions, ratios, and percents).						
	Performance Expectation	Learning Target	Comments	Vocabulary	Games	Advanced Prep	RSAs	Writing/Reasoning Prompt – Math Boxes
12*1	<p>5.2.D Determine the greatest common factor and the least common multiple of two or more whole numbers.</p> <p>5.5.A Classify numbers as prime or composite.</p> <p>7.5.B Write the prime factorization of whole numbers greater than 1, using exponents when appropriate.</p>	Find greatest common factors and least common multiples using factor strings and trees. PE 5.2.D & 7.5.B▼	This lesson was moved to Unit 8.	prime factorization, factor tree, common factor, greatest common factor, least common multiple	<i>P2 Factor Captor</i> . SRB p306, MM p455 PE 5.5.A		Use factor trees to factor numbers and identify prime factorization. PE 7.5.B▼	TLG p918, "Explain your solution strategy for Math Boxes No. 2."
12*2	<p>6.3.G Determine the theoretical probability of an event and its complement and represent the probability as a fraction or decimal from 0 to 1 or as percent from 0 to 100.</p> <p>7.4.A Represent the sample space of probability experiments in multiple ways, including tree diagrams and organized lists.</p>	Share diagrams and charts to justify multiplication as a strategy for calculating the number of possible combinations in given situations. PE 7.4.A	Skip the rest of Unit 12. This material will be covered in depth in Middle School. If time allows, go through the Math Boxes and select appropriate problems as review.	probability, Multiplication Counting Principle, tree diagram, equally likely		Prepare two charts or teaching masters: one of the array chart on TLG p922 of the entry and exit gates and the second of the tree diagram on TLG p923. Part 3 (E) uses the book, "Jumanji".	Solve and rephrase probability problems using fractions and basic probability terms. PE 6.3.G	
12*3	<p>4.2.D Convert a decimal to a fraction and vice versa and visually represent the number.</p> <p>5.4.C Write algebraic expressions that represent simple situations and evaluate the expressions, using substitution when variables are involved.</p> <p>5.5.C Construct and interpret line graphs.</p> <p>6.3.A Identify and write ratios as comparisons of part-to-part and part-to-whole relationships.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	Use ratios on a line graph to examine trends. (American Tour Project) PE 6.3.A▼ & 5.5.C▼		ratio, ratio comparison, magnitude	<i>P2 First to 100</i> . SRB p308, MM p456-8 PE 5.4.C		Convert between fractions, decimals, and percents. PE 4.2.D▲ & 6.3.C	
12*4	<p>3.3.A Represent fractions that have denominators of 2, 3, 4, 5, 6, 8, 9, 10, and 12 as parts of a whole, parts of a set, and points on the number line.</p> <p>6.3.A Identify and write ratios as comparisons of part-to-part and part-to-whole relationships.</p>	Use tiles to solve ratio problems. PE 3.3.A▲ & 6.3.A	This lesson was moved to Unit 5 and was Optional.			For Part 1, provide a small envelope for each student to save tiles cut from SMJ2, Activity Sheet 7. Consider using square plastic tiles or 2-color counters for Part 1 instead of cutting out paper tiles. Planning Ahead: Lesson 12.7 uses heart-rate data collected during strenuous activity. If needed, see sample permission slips MM p360.	Solve ratio problems. PE 3.3.A▲	TLG p934, "If you did not have a calculator available for No. 4, what value would you use for π (pi)?"
12*5	<p>4.1.F Fluently and accurately multiply up to a three-digit number by one- and two-digit numbers using the standard multiplication algorithm.</p> <p>4.1.H Estimate products to approximate solutions to problems and determine reasonableness of answers.</p> <p>5.2.C Given two fractions with unlike denominators, rewrite the fractions with a common denominator.</p> <p>6.3.D Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.</p>	Use multiplication when finding equivalent fractions to solve ratio problems. PE 5.2.C, 6.3.D	This lesson was moved to Unit 5 and was Optional.				Estimate and solve multidigit multiplication problems. PE 4.1.H▲ & 4.1.F▲	

12↕6	<p>6.1.D Fluently and accurately multiply and divide non-negative fractions and explain the inverse relationship between multiplication and division with fractions.</p> <p>6.1.E Multiply and divide whole numbers and decimals by 1000, 100, 10, 1, 0.1, 0.01, and 0.001.</p> <p>6.3.C Represent percents visually and numerically, and convert between the fractional, decimal, and percent representations of a number.</p>	<p>Determine equivalent amounts between ratios, fractions, decimals and percents of sets. (Spoon Scramble) PE 6.3.C, 6.1.E & 6.1.D▼</p>	<p>Skip the rest of Unit 12. This material will be covered in depth in Middle School. If time allows, go through the Math Boxes and select appropriate problems as review.</p>	<p>pulse, pulse rate, heart rate</p>	<p><i>P1 Spoon Scramble:</i> SRB p330, MM p503 PE 6.1.E & 6.3.C</p>	<p>Part 1: Provide timers for <i>Finding Heart Rates</i> Activity. Provide spoons for <i>Spoon Scramble</i> activity. Part 3 (E) requires access to research materials.</p>	<p>Express ratios in a variety of ways. PE 6.3.C, 6.1.E & 6.1.D▼</p>	<p>TLG p944, "Explain your solution strategy for No. 4."</p>
12↕7	<p>4.2.H Round fractions and decimals to the nearest whole number.</p> <p>4.4.E Determine the median, mode, and range of a set of data and describe what each measure indicates about the data.</p> <p>5.5.C Construct and interpret line graphs.</p>	<p>Collect, graph, compare and interpret data. PE 4.4.E & 5.5.C</p>		<p>rate, profile, target heart rate</p>		<p>Possible 2-Day Lesson Provide sticky notes for chair stepping activity. Prepare six vertical number lines, each 3 ft high: See TLG p946.</p>	<p>Round numbers to a specified place-value digit. PE 4.2.H▲</p>	
12↕8	<p>4.4.D Graph and identify points in the first quadrant of the coordinate plane using ordered pairs.</p> <p>6.3.D Solve single- and multi-step word problems involving ratios, rates, and percents, and verify the solutions.</p>	<p>Use rate data to solve conversion problems. PE 6.3.D▼</p>		<p>oxygen, nutrients, carbon dioxide, cardiac output</p>	<p><i>P2 Coordinate Search:</i> MM p448-9 PE 4.4.D</p>	<p>Part 3 (E) uses the book, "If You Hopped Like a Frog".</p>	<p>Plot and label ordered pairs on a coordinate grid. PE 4.4.D▲</p>	