

Grade 2 Mathematics Curriculum Guide

Grade Level/Course Title: Grade 2	Trimester 1	Academic Year: 2014-2015		
<p>Grade Level Mathematics Focus: In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.</p>				
<p>Essential Questions for this Unit:</p> <ol style="list-style-type: none"> How can students extend their understanding of the base-ten system, including ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing? How can students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones)? 				
Unit (Time)	Standard	Standard Description	Content	Resources
<p>(Aug.-Oct.)</p> <p style="text-align: center;">Unit 1:</p> <p style="text-align: center;">Place Value, Addition and Subtraction</p> <p style="text-align: center;">(Approx. 40 days)</p>	<p>2.OA.1</p> <hr/> <p>2.OA.2</p> <hr/> <p>2.OA.3</p> <hr/> <p>2.OA.4</p>	<p>Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <hr/> <p>Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.</p> <hr/> <p>Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.</p> <hr/> <p>Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.</p>	<ul style="list-style-type: none"> • Using open number lines and bar models with single digit numbers • Decomposition by place value • Decomposition of whole numbers by addition • Using decomposition to add and subtract whole numbers • Using open number lines to represent multi-digit addition and subtraction • Using bar models to add and subtract multi-digit numbers • Inverse relationship between addition and subtraction • Commutative and associative properties of addition 	<p><u>Number Sense, Place Value, Addition, and Subtraction (15 days)</u></p> <p>Adding and Subtracting Within 100 [L]</p> <p>Adding By Finding Tens [L]</p> <p>Represent Unknowns Using Multiple Methods [L]</p> <p>Lesson 1.1: Math Message and Number Sequences</p> <p>Lesson 1.2: Tools and Coins</p> <p>Lesson 1.3: Calendars and Clocks</p> <p>Lesson 1.4: Partner Study Routines</p> <p>Lesson 1.5: Grouping by Tens - \$1, \$10, \$100</p> <p>Lesson 1.6: Math Boxes</p> <p>Lesson 1.7: Working in Small Groups</p> <p>Lesson 1.8: Number Grids</p> <p>Lesson 1.9: Equivalent Names for Numbers</p> <p>Lesson 1.10: Counting Patterns</p> <p>Lesson 1.11: Relations (<, >, =) and Home Links</p> <p>Lesson 1.13: Progress Check</p>

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In Grade 2, instructional time should focus on four critical areas: (1) extending understanding of base-ten notation; (2) building fluency with addition and subtraction; (3) using standard units of measure; and (4) describing and analyzing shapes.					
Essential Questions for this Unit:					
<ol style="list-style-type: none"> How can students extend their understanding of the base-ten system, including ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing? How can students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones)? 					
Unit (Time)	Standard	Standard Description	Content	Resources	
(Aug.-Oct.)	2.OA.1	Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.	<ul style="list-style-type: none"> Using open number lines and bar models with single digit numbers Decomposition by place value Decomposition of whole numbers by addition Using decomposition to add and subtract whole numbers Using open number lines to represent multi-digit addition and subtraction Using bar models to add and subtract multi-digit numbers Inverse relationship between addition and subtraction Commutative and associative properties of addition 	<p align="center"><u>More Addition and Subtraction Strategies (15 days)</u></p> <p>Lesson 2.1: Addition Number Stories Lesson 2.3: Double Facts Lesson 2.4: Turn-Around Facts and the +9 Shortcuts Lesson 2.5: Addition Strategies with Double Facts Lesson 2.6: Subtraction From Addition Adding and Subtracting — Inverse Operations [L] Lesson 2.7: Fact Families Fact Families [L] Lesson 2.9: Name Collections Lesson 2.10: Frames and Arrows Routines Lesson 2.11: What's My Rule Lesson 2.12: Counting Strategies for Subtraction Lesson 2.13: Shortcuts for Harder Subtraction Facts Lesson 2.14: Progress Check</p>	
Unit 1: (Continued)	2.OA.2	Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.			
Place Value, Addition and Subtraction	2.OA.3	Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.			
(Approx. 40 days)	2.OA.4	Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.			

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Essential Questions for this Unit:				
<ol style="list-style-type: none"> 1. How can students extend their understanding of the base-ten system, including ideas of counting in fives, tens, and multiples of hundreds, tens, and ones, as well as number relationships involving these units, including comparing? 2. How can students understand multi-digit numbers (up to 1000) written in base-ten notation, recognizing that the digits in each place represent amounts of thousands, hundreds, tens, or ones (e.g., 853 is 8 hundreds + 5 tens + 3 ones)? 				
Unit (Time)	Standard	Standard Description	Content	Resources
<p style="color: blue;">(Aug.-Oct.)</p> <p style="text-align: center;">Unit 1: (Continued)</p> <p style="text-align: center;">Place Value, Addition and Subtraction</p> <p style="color: red;">(Approx. 40 days)</p>	<p>2.OA.1</p> <hr/> <p>2.OA.2</p> <hr/> <p>2.OA.3</p> <hr/> <p>2.OA.4</p>	<p>Use addition and subtraction within 100 to solve one- and two-step word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.</p> <hr/> <p>Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.</p> <hr/> <p>Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends.</p> <hr/> <p>Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.</p>	<ul style="list-style-type: none"> • Using open number lines and bar models with single digit numbers • Decomposition by place value • Decomposition of whole numbers by addition • Using decomposition to add and subtract whole numbers • Using open number lines to represent multi-digit addition and subtraction • Using bar models to add and subtract multi-digit numbers • Inverse relationship between addition and subtraction • Commutative and associative properties of addition 	<p style="text-align: center;"><u>Applying Addition and Subtraction (10 days)</u></p> <p>Lesson 3.1: Numeration and Place Value Lesson 3.2: Using Coins to Buy Things Lesson 3.3: Telling Time Lesson 3.4: Exploring Numbers, Time and Geo-Boards Lesson 3.5: Data Day: Pockets Lesson 3.7: Making Change by Counting Up Lesson 3.8: Coin Exchanges Lesson 3.9: Progress Check</p>

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Essential Questions for this Unit:				
<ol style="list-style-type: none"> 1. How can students use their understanding of addition to develop fluency with addition and subtraction within 100? 2. How can students learn to solve problems within 1000 by applying their understanding of models for addition and subtraction, and develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations? 3. How can students select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds? 				
Unit (Time)	Standard	Standard Description	Resources	
Unit 2: More Addition and Subtraction (Approx. 15 days)	2.NBT.1	Understand that the three digits of a three-digit number represent amounts of hundreds, tens, and ones; e.g., 706 equals 7 hundreds, 0 tens, and 6 ones. Understand the following as special cases: a. 100 can be thought of as a bundle of ten tens — called a “hundred.” b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	<ul style="list-style-type: none"> • Decomposition by place value and within place values • Open number lines • Bar models • Inverse relationship between addition and subtraction with multi-digit numbers • Commutative and associative properties of addition 	<u>Addition and Subtraction with Larger Numbers (15 days)</u> Lesson 4.1: Change to More Number Stories Lesson 4.2: Parts-and-Total Number Stories Lesson 4.3: Exploring Temperature, Money and Shapes Lesson 4.5: Estimating Costs Lesson 4.6: A Shopping Activity Lesson 4.7: Exploring Length, Area and Attributes Lesson 4.8: Paper and Pencil Addition Strategies Lesson 4.9: Partial-Sums Addition Algorithm Adding Whole Numbers — Multiple Algorithms [L] Adding and Subtracting Whole Numbers — Multiple Representations [CP] Lesson 4.10: Progress Check
	2.NBT.2	Count within 1000; skip-count by 2s , 5s, 10s, and 100s. CA		
	2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.		
	2.NBT.4	Compare two three-digit numbers based on meanings of the hundreds, tens, and ones digits, using $>$, $=$, and $<$ symbols to record the results of comparisons.		

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Essential Questions for this Unit:			
<ol style="list-style-type: none"> 1. How can students use their understanding of addition to develop fluency with addition and subtraction within 100? 2. How can students learn to solve problems within 1000 by applying their understanding of models for addition and subtraction, and develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations? 3. How can students select and accurately apply methods that are appropriate for the context and the numbers involved to mentally calculate sums and differences for numbers with only tens or only hundreds? 			
Unit (Time)	Standard	Standard Description	Resources
Unit 2: (Continued) More Addition and Subtraction (Approx. 15 days)	2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	<p style="text-align: center;"><u>Addition and Subtraction with Larger Numbers</u> <u>(15 days, continued)</u></p> <p>Adding Whole Numbers — Multiple Algorithms [L] Adding By Finding Tens [L] Comparing Numbers [L] Multi-Step Word Problems [L] Subtracting Whole Numbers — Multiple Methods [L] Subtraction — Comparison Model [L] Sums to 10, 100, and 1,000 [L]</p> <p style="text-align: center;">BENCHMARK 1 (Units 1 through 2)</p>
	2.NBT.6	Add up to four two-digit numbers using strategies based on place value and properties of operations.	
	2.NBT.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. 7.1 Use estimation strategies to make reasonable estimates in problem solving. CA	
	2.NBT.8	Mentally add 10 or 100 to a given number 100–900, and mentally subtract 10 or 100 from a given number 100–900.	
	2.NBT.9	Explain why addition and subtraction strategies work, using place value and the properties of operations.	
		<ul style="list-style-type: none"> • Decomposition by place value and within place values • Open number lines • Bar models • Inverse relationship between addition and subtraction with multi-digit numbers • Commutative and associative properties of addition 	

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Essential Questions for this Unit: 1. How can students describe and analyze shapes by examining their sides and angles? 2. How can students investigate, describe, and reason about decomposing and combining shapes to make other shapes? 3. How can students, through building, drawing, and analyzing two- and three-dimensional shapes, develop a foundation for understanding area, volume, congruence, similarity, and symmetry in later grades?					
Unit (Time)	Standard	Standard Description	Content	Resources	
Unit 3: Geometry and Introduction to Fractions (Approx. 15 days)	2.G.1	Recognize and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	<ul style="list-style-type: none"> Attributes of geometric shapes Decomposing and re-composing shapes Foundations of area, volume, congruence, similarity, and symmetry Equal share (fractional) representations of two dimensional shapes Understanding equal shares (equivalent fractions) need not be represented by the same shape, e.g., one-half of the same whole can be represented with different shapes 	<u>Understanding Shapes (15 days)</u>	
	2.G.2	Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.		Lesson 5.1: Exploring Rules to Classify Shapes, Develop Readiness for Division, Telling Time Decomposing/Recomposing Geometric Shapes [L] Lesson 5.4: EXPLORATIONS: Exploring Polygons, Arrays, and Attributes Lesson 5.5: Quadrangles Lesson 5.6: 3-Dimensional Shapes Lesson 5.7: Pyramids (optional) Lesson 5.8: Line Symmetry Review Lesson 5.9: Progress Check Lesson 8.1: Equal Parts of One	
	2.G.3	Partition circles and rectangles into two, three, or four equal shares, describe the shares using the words <i>halves</i> , <i>thirds</i> , <i>half of</i> , <i>a third of</i> , etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.			

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Essential Questions for this Unit: 1. How can students recognize the need for standard units of measure (centimeter and inch) and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units? 2. How can students recognize that the smaller the unit, the more iterations they need to cover a given length?					
Unit (Time)	Standard	Standard Description	Content	Resources	
(Jan.-Feb.)	2.MD.1	Measure the length of an object by selecting and using appropriate tools such as rulers, yardsticks, meter sticks, and measuring tapes.	<ul style="list-style-type: none"> • Concept of iteration for measurement • Understanding the need for standard units • Length • Relate addition and subtraction to length 	<u>Understanding Measurement (15 days)</u>	
Unit 4: Measurement	2.MD.2	Measure the length of an object twice, using length units of different lengths for the two measurements; describe how the two measurements relate to the size of the unit chosen.		Appropriate and Correct Measurement [L] Lesson 9.1: Measuring with Yards and Meters Lesson 9.2: Linear Measures Measurement in the Primary Grades [L] Lesson 9.5: Measuring Longer Distances (optional) Lesson 9.9: Weight (optional) Review Lesson 9.10: Progress Check	
	2.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters.			
	2.MD.4	Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.			
	2.MD.5	Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.			
	2.MD.6	Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2, ..., and represent whole-number sums and differences within 100 on a number line diagram.			
(Approx. 15 days)					

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Essential Questions for this Unit: 1. How can students learn to solve problems within 1000 by applying their understanding of models for addition and subtraction, and develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations? 2. How can students recognize the need for standard units of measure (centimeter and inch) and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units? 3. How can students recognize that the smaller the unit, the more iterations they need to cover a given length?			
Unit (Time)	Standard	Standard Description	Resources
Unit 5: Whole Number Operations, Patterns, Data, and Rules (Approx. 20 days)	2.NBT.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. 7.1 Use estimation strategies to make reasonable estimates in problem solving. CA	Applying Whole Numbers and Measurement (20 days) Lesson 6.1: Addition of Three or More Numbers Lesson 6.2: Comparison Number Stories Lesson 6.3: Data Day: The Four Food Groups Lesson 6.4: Mixed Addition and Subtraction Stories Lesson 6.5: Subtraction Strategies Lesson 6.7: Multiples of Equal Groups Lesson 6.8: Multiplication – Array Number Stories Lesson 6.9: Multiplication with Arrays Review and Lesson 6.11: Progress Check Lesson 7.2: Extending Complements of 10 Lesson 7.1: Patterns in Counting Lesson 7.3: Mental Arithmetic for 3 Addends Lesson 7.4: Double and Halves Lesson 7.6: Measurement to Nearest Inch and Centimeter Line Plots Using Measurement [L] Graphing in the Primary Grades [L] Lesson 7.8: Frequency Distributions Review and Lesson 7.9: Progress Check BENCHMARK 2 (Units 3 through 5)
	2.MD.3	Estimate lengths using units of inches, feet, centimeters, and meters.	
	2.MD.9	Generate measurement data by measuring lengths of several objects to the nearest whole unit, or by making repeated measurements of the same object. Show the measurements by making a line plot, where the horizontal scale is marked off in whole-number units.	
	2.MD.10	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put-together, take-apart, and compare problems using information presented in a bar graph.	

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Essential Questions for this Unit:				
<ol style="list-style-type: none"> How can students learn to solve problems within 1000 by applying their understanding of models for addition and subtraction, and develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations? How can students recognize the need for standard units of measure (centimeter and inch) and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units? How can students recognize that the smaller the unit, the more iterations they need to cover a given length? 				
Unit (Time)	Standard	Standard Description	Content	Resources
Unit 6: Money, Place Value, and Whole Number Operations Revisited (Approx. 45 days)	2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	<ul style="list-style-type: none"> Decomposition by place value and within place value as a strategy to add or subtract Representing addition and subtraction in multiple ways, e.g., bar models and open number lines Concepts of time, money, and solving problems in these contexts 	<p style="text-align: center;"><u>Applications of Time and Money (25 days)</u></p> <p>Time on a Number Line [L] Lesson 10.1: Money Show Me the Money! [L] Money [L] Lesson 10.2: Decimal Notation Lesson 10.3: Money Amounts with Calculator Lesson 10.4: Calculator with Money Lesson 10.5: Estimates/ Finding Costs Lesson 10.6: Making Change Lesson 10.7: Exploring Area (optional) Lesson 10.8: Place Value Lesson 10.9: Place Value Tools Lesson 10.11: Grouping with Parentheses Review and Lesson 10.12: Progress Check Adding Whole Numbers — Multiple Algorithms [L] Adding By Finding Tens [L] Comparing Numbers [L] Multi-Step Word Problems [L] Subtracting Whole Numbers — Multiple Methods [L] Subtraction — Comparison Model [L] Sums to 10, 100, and 1,000 [L]</p>
	2.NBT.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. 7.1 Use estimation strategies to make reasonable estimates in problem solving. CA		
	2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. Know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year). CA		
	2.MD.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. <i>Example: If you have 2 dimes and 3 pennies, how many cents do you have?</i>		

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Essential Questions for this Unit:					
<ol style="list-style-type: none"> 1. How can students learn to solve problems within 1000 by applying their understanding of models for addition and subtraction, and develop, discuss, and use efficient, accurate, and generalizable methods to compute sums and differences of whole numbers in base-ten notation, using their understanding of place value and the properties of operations? 2. How can students recognize the need for standard units of measure (centimeter and inch) and use rulers and other measurement tools with the understanding that linear measure involves an iteration of units? 3. How can students recognize that the smaller the unit, the more iterations they need to cover a given length? 					
Unit (Time)	Standard	Standard Description	Content	Resources	
(April-June) Unit 6: (Continued) Money, Place Value, and Whole Number Operations Revisited (Approx. 45 days)	2.NBT.5	Fluently add and subtract within 100 using strategies based on place value, properties of operations, and/or the relationship between addition and subtraction.	<ul style="list-style-type: none"> • Decomposition by place value and within place value as a strategy to add or subtract • Representing addition and subtraction in multiple ways, e.g., bar models and open number lines • Concepts of time, money, and solving problems in these contexts 	<u>More Applications of Addition and Subtraction (10 days)</u> Lesson 11.1: Addition Number Stories Cents Lesson 11.2: Subtraction Number Stories Cents Lesson 11.3: Trade-First Subtraction Algorithm	
	2.NBT.7	Add and subtract within 1000, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method. Understand that in adding or subtracting three-digit numbers, one adds or subtracts hundreds and hundreds, tens and tens, ones and ones; and sometimes it is necessary to compose or decompose tens or hundreds. 7.1 Use estimation strategies to make reasonable estimates in problem solving. CA		<u>Extension to Beginning Multiplication (10 days)</u> Lesson 11.4: Multiples of Equal Groups (optional) Lesson 11.5: Division Number Models (optional) Lesson 11.6: Multiplication Facts (optional) Lesson 11.7: Products Table (optional) Lesson 11.8: Multiplication/ Division Fact Families (optional) Review and Lesson 11.10: Progress Check	
	2.MD.7	Tell and write time from analog and digital clocks to the nearest five minutes, using a.m. and p.m. Know relationships of time (e.g., minutes in an hour, days in a month, weeks in a year). CA		Lesson 12.1: Review: The Calendar Lesson 12.2: Review: Clock Skills Lesson 12.3: Timelines	
	2.MD.8	Solve word problems involving dollar bills, quarters, dimes, nickels, and pennies, using \$ and ¢ symbols appropriately. <i>Example: If you have 2 dimes and 3 pennies, how many cents do you have?</i>		Lesson 12.5: Division From Multiplication (optional) Lesson 12.6: Graphs: Comparing Speeds of Animals and People Review and Lesson 12.8: Progress Check California Projects	
BENCHMARK 3 (Unit 6)					