SAN DIEGO CITY SCHOOLS

2004-2005

Instructional Module to Enhance the Teaching of

HARCOURT

Math

California Edition

Grade 3

Module 3 -Revised

UNDERSTAND NUMBERS AND OPERATIONS

— WORK IN PROGRESS — MODIFIED

Grade Three – Traditional Calendar – 2004-2005
Order of Units and Pacing Guide

Month	Module	Number of Days
September 19 instructional days	**Module 1:** Data, Graphing and Probability **Module 2:** Multiplication Concepts and Facts	10 days 9 days
October 21 instructional days	**Module 2:** Multiplication Concepts and Facts **Module 3:** Understand Numbers and Operations	16 days 5 days
November 18 instructional days	**Module 3:** Understand Numbers and Operations	18 days
December 13 instructional days Winter Break 12/20 – 12/31	**Module 3:** Understand Numbers and Operations **Module 4:** Geometry	2 days 11 days
January 20 instructional days	**Module 4:** Geometry **Module 5:** Division Concepts and Facts	9 days 11 days
February 17 instructional days	**Module 5:** Division Concepts and Facts **Module 6:** Fractions and Decimals	8 days 9 days
March 18 instructional days Spring Break 3/21 – 3/25	**Module 6:** Fractions and Decimals **Module 7:** Multiply and Divide by 1-Digit Numbers	11 days 7 days
April 20 instructional days	**Module 7:** Multiply and Divide by 1-Digit Numbers **Module 8:** Measurement	17 days 3 days
May 21 instructional days STAR 4/26 – 5/17	**Module 8:** Measurement	17 days
June 13 instructional days	**Module 9:** Data, Graphing, and Probability	6 days

Grade Three – Year Round Calendar – 2004-2005
Order of Units and Pacing Guide

Month	Module	Number of Days
September 19 instructional days	**Module 1:** Data, Graphing and Probability	10 days
	Module 2: Multiplication Concepts and Facts	9 days
October 21 instructional days	**Module 2:** Multiplication Concepts and Facts	16 days
	Module 3: Understand Numbers and Operations	5 days
November 18 instructional days	**Module 3:** Understand Numbers and Operations	18 days
December 13 instructional days Winter Break 12/22 – 1/17	**Module 3:** Understand Numbers and Operations	2 days
	Module 4: Geometry	11 days
January 10 instructional days	**Module 4:** Geometry	9 days
February 17 instructional days	**Module 5:** Division concepts and Facts	17 days
March 11 instructional days Spring Break 3/16 – 4/8	**Module 5:** Division concepts and Facts	2 days
	Module 6: Fractions and Decimals	9 days
April 15 instructional days	**Module 6:** Fractions and Decimals	11 days
	Module 7: Multiply and Divide by 1-Digit Numbers	4 days
May 21 instructional days	**Module 7:** Multiply and Divide by 1-Digit Numbers	20 days
June 22 instructional days STAR 5/27 – 6/17	**Module 8:** Measurement	17 days
July 14 instructional days	**Module 8:** Measurement	3 days
	Module 9: Data, Graphing, and Probability	6 days

San Diego City Schools
Instruction and Curriculum Division

GRADE 3 – MATHEMATICS CURRICULUM MAP

MODULE 3 – UNDERSTANDING NUMBERS AND OPERATIONS

Modules represent individual units of study that lead to essential learnings

THREADS THROUGHOUT THE YEAR:

The threads represent ongoing learning opportunities in which students should be actively engaged throughout all units of inquiry during the entire school year. These items should not be isolated to any one particular unit of inquiry.

Students will:

- Develop understanding of numbers and the number system and use their understanding to solve problems and recognize reasonable results.
- Develop understanding of and fluency in basic computation and procedural skills.
- Use mathematical reasoning to solve problems.
- Communicate their mathematical thinking by using words, numbers, symbols, graphs and charts.
- Use equations and variables to express generalizations of patterns and relationships.
- Develop logical thinking to analyze evidence and build arguments to support or refute a hypothesis.
- Make connections among mathematical ideas and between other disciplines.
- Develop and use strategies, skills, and concepts to solve problems.
- Use appropriate tools, including technology, as vehicles to learn mathematical concepts.

These are essential learnings that represent bigger ideas/concepts:

- Students translate between different representations of mathematical solutions and situations.
- Students understand that the position of digits in numbers determines the value of the digits.
- Students understand that the positions of digits in numbers are related by a pattern involving powers of ten.
- Students understand that numbers can be taken apart by place value and in different ways.
- Students estimate using compatible numbers.
- Students understand large numbers in relation to benchmark numbers and familiar contexts.

These are essential questions that learners ask themselves in order to achieve the essential learnings:

- **How do I use the number line as a tool for combining and finding the difference between numbers?*
- How do I compare the relationships of numbers *using base-ten materials*, number lines*, and place value charts**?*
- **How do I find the value of a digit by using its place-value position?*
- How do I use concrete and pictorial models to represent numbers through the thousands?
- How do I connect equivalent representations using place value charts, base-ten materials, expanded notation, and standard notation?
- How do I read, write, and identify the value of digits in numbers through 10,000?
- How does my understanding of place value help me to develop strategies to order and compare numbers through 10,000?
- What are strategies I can explain and use for rounding numbers to ten thousand?
- How do I use benchmark numbers to help develop the ability to estimate and understand the relative magnitude of numbers?
- How do I use the Associative Property* of addition to add 2- and 3-digit numbers?
- **How do I use concrete materials to solve addition and subtract problems requiring regrouping and represent the solutions symbolically?*
- How do I write expressions that represent situations involving addition and subtraction?
- How do I select operational symbols to make number sentences true involving addition and subtraction?
- How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract?
- How do I estimate the sum of and the difference between two numbers and to check the reasonableness of an answer?
- What are strategies I can explain and use for rounding numbers to ten thousand?
- How can my understanding of place value help me develop strategies to order and compare numbers through ten thousand?

**** Presented in previous grades***

Resources: Van de Walle: Chapters 12 & 13 (pp. 178-199 & 201-225); *Mathematics Source Book: Number & Addition and Subtraction* (pp. 7-26)

ADDITION and SUBTRACTION

Key Concepts

- Addition is used to combine two or more quantities.
- Addition is used to show a change or increase from a starting amount
- Subtraction is used to take away from, take apart, or decrease from, a quantity.
- Subtraction is used to compare two quantities or to show difference between two quantities.
- Addition or subtraction can be used to solve missing addend situations.

Tips for Learning Multi-digit Addition and Subtraction

- *Have students mentally add or subtract to strengthen place value understanding and computation flexibility. As students solve many problems have them:*

  Combine tens and combine ones: 53 + 44 can be solved by adding 50 + 40 to get 90, adding 3 + 4 to get 7, and then adding 90 + 7 for a sum of 97.

  Count up by tens and then by ones: 53 + 44 can be solved by counting up "53, 63, 73, 83, 93: 93 + 4 is 97." Or, "53 + 40 is 93; 93 + 4 is 97." The difference 100 – 88 could be found by counting up "88, 98, 99, 100, that's 12."

  Use derived facts: If you know 8 + 8 is 16, you know "8 + 9 is 17 because it's one more." Similarly, if you know 25 + 25 is 50, you know " 25 + 27 is 52 because it's just 2 more." Also, if you know 3 + 5 is 8 you know "30 + 50 is 80."

  Use compensation to change to simpler numbers: 42 + 29 can by changed to 41 + 30 by decreasing 42 by 1 and increasing 29 by 1. Similarly, 33 – 18 can be changed to a simpler problem with an equal difference (35 – 20) by adding 2 to each number.

  Break apart numbers (decompose and recombine): 28 + 6 can be solved by thinking "28 and 2 more would be 30," then breaking 6 into 2 + 4 and finally thinking "30 and 4 more is 34."

  Count on , as in making change: 75¢ - 58¢ can be thought of as "58 and 2 more makes 60¢, and 15 more is 75¢. So, 75¢ is 2 more and 15 more, or 17¢ more, than 58¢.

More tips on page 23 – 26 of A Mathematics Source Book for Elementary and Middle School Teachers, A Report by Bay Area Mathematics Task Force: Arena Press: (800) 422-7249 (for additional copies of this document)

UNDERSTAND NUMBERS AND OPERATIONS
5 Weeks of Instruction (25 days) – Unit 1

Day 1:	**Day 2:**	**Day 3:**	**Day 4:**	**Day 5:**
Chapter 1: Place Value and Number Sense Lesson 1.2 Understand Place Value	Lesson 1.3 (Day 1 of 2) Understand Numbers to 10,000	Lesson 1.3 (Day 2 of 2) Understand Numbers to 10,000	Lesson 1.4 (Day 1 of 2) Understand 10,000	Lesson 1.4 (Day 2 of 2) Understand 10,000
Day 6:	**Day 7:**	**Day 8:**	**Day 9:**	**Day 10:**
Chapter 2; Compare, Order and Round Numbers Lesson 2.1 Size of Numbers	Lesson 2.2 (Day 1 of 2) Compare Numbers	Lesson 2.2 (Day 2 of 2) Compare Numbers	Lesson 2.3 & 2.4 (combined) Order Numbers and Problem Solving	Lesson 2.5 & 2.6 (Day 1 or 2; combined) Round to Nearest 10, 100, 1000
Day 11:	**Day 12:**	**Day 13:**	**Day 14:**	**Day 15:**
Lesson 2.5 & 2.6 (Day 2 of 2) Rounding Numbers Using Number Lines	**Chapter 3 & 4 Combined: Addition and Subtraction** Lesson 3.1 Using the Associative Property to Add	Lesson 4.6 (Day 1 of 2) Algebra: Expressions & Number Sentences	Lesson 4.6 (Day 2 of 2) Algebra: Expressions & Number Sentences	Lesson 3.2 & 4.1 Estimate Sums and Differences
Day 16:	**Day 17:**	**Day 18:**	**Day 19:**	**Day 20:**
Lesson 3.3-4.6 Adding and Subtracting Multi-digit Numbers	Lesson 3.3-4.6 Adding and Subtracting Multi-digit Numbers	Lesson 3.3-4.6 Adding and Subtracting Multi-digit Numbers	Lesson 3.3-4.6 Adding and Subtracting Multi-digit Numbers	Lesson 3.3-4.6 Adding and Subtracting Multi-digit Numbers
Day 21	**Day 22:**	**Day 23:**	**Day 24:**	**Day 25:**
Lesson 4.4 Subtract Across Zeros	Lesson 3.3-4.6 Adding and Subtracting of Multi-digit Numbers	**Unit Review**		

Unit 1: Understand Number and Operations

MODULE 3 NOTES

- Lessons from chapter 3 & 4 have been combined because addition and subtraction are related and should not be taught in isolation. Combining addition and subtraction also makes each lesson more problematic. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use, make meaning of the operations and they will also get opportunities to make connections and see relationships between the operations.

- On days 13 and 14, lesson 4.6 (Algebra: Expressions & Number Sentences) will be taught prior to the lessons on addition and subtraction of multi-digit numbers. The essential questions from these two lessons are threaded throughout the lessons on adding and subtracting multi-digit numbers to help solidify these important ideas. The essential questions from day 13 and 14 are*: How do I write expressions that represent situations? How do I select operational symbols to make number sentences true?*

- The essential question from day 15, lesson 3.2 & 4.1 (Estimate Sums and Differences) is embedded throughout all lessons on adding and subtracting multi-digit numbers. The essential question, *How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer?,* should be included throughout the year when calculating numbers.

DAY: 1
Unit 1: UNDERSTANDING NUMBERS AND OPERATIONS
Chapter 1: Place Value and Number Sense
LESSON 1.2, pp. 4-5

MATERIALS:	Base-ten materials – 1 bag of units, rods & flats for 2 students, graph paper (TR 57) 1 piece per child, place value chart (1 per partnership TR11)
LESSON FOCUS:	**Understand Place Value**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0**: Understand place value of whole numbers. **1.3**: Identify place value for each digit in numbers to 10,000. **1.5**: Use expanded notation to represent numbers. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• How do I find the value of a digit by using its place-value position? • How do I connect equivalent representations using place value charts, base-ten materials, expanded notation, and standard notation?
LAUNCH: Materials: base-ten blocks, graph paper for pictorial representations of base-ten blocks.	Ask students to use base-ten blocks to represent the number 248. Questions: • What does each of the blocks represent? • Is there another way to write the number 248? (e.g., 200 + 40 + 8, 200 + 30 + 10 + 8, two hundred forty-eight) *Have students discuss with a partner and then share out answers to whole group.* SCAFFOLD: Begin with a 2-digit number, then move to a 3-digit number. Note: The purpose of this LAUNCH is to help students connect equivalent representations using base ten materials, expanded notation, and standard notation. It is important to highlight the following vocabulary during this discussion: digit, expanded notation, standard notation, and word form.
EXPLORE: Materials: base-ten blocks, graph paper (TR 57), pencils, large pieces of paper, place value charts (1 per partnership; TR11)	Chart the following problem: ***Represent 365 in as many different ways as you can, with materials and numbers****. (Have students work with partners or small groups.)* When conferring with small groups keep in mind the following: • Students should represent the possible answers using blocks, words, standard notation, expanded notation. • Students should be able to explain how each block represents the appropriate digit in the number. • Variety is important. (e.g., 300 + 60 + 5, three hundred sixty-five, 365) • Are students using strategies that take advantage of place value? (i.e., place value charts, graph paper to make pictorial representations of the base-ten system, base-ten blocks).

	Guiding Questions while conferring with groups: • How does the base-ten representation connect to standard form/expanded form? • Have you found all the possibilities? How do you know? • How does this relate to the problem we did in the launch? • What do you know about the number 365? • How would you show your number on a place value chart? • CHALLENGE: Using base-ten blocks, how can you show the number 365 without using the hundreds blocks? Extension: Continue with other numbers. Students may choose these numbers. Have students choose numbers with 4 digits.
SUMMARIZE:	Revisit the Essential Questions: • *How do I find the value of a digit by using its place-value position?* • *How do I connect equivalent representations using place value charts, base-ten materials, expanded notation, and standard notation?* *NOTE: Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking?* Ask selected partnerships or small groups to explain to the class what their strategies were for representing the number 365. Guiding Questions: • What does your group know about the number 365? • How did you decide to break up the number? • What strategies did you use to solve the problem? • How does the base-ten representation connect to standard form/expanded form? • How would you show your number on a place value chart? • How do you know the value of each digit? • How does this problem relate to the problem we did in the launch?
PRACTICE/ HOMEWORK:	Represent 492 in as many different ways as you can, with materials and numbers.

DAY: 2
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 1: Place Value and Number Sense
LESSON 1.3, pp. 6-7

MATERIALS:	One-centimeter graph paper (TR57 3-4 sheets per pair), scissors, glue or tape, crayons or markers, base-ten blocks, coins, 100 charts (TR15), calculators
LESSON FOCUS:	**Understand Numbers to 10,000**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0**: Understand the place value of whole numbers **1.1:** Count read and write whole numbers to 10,000. **1.5**: Use expanded notation to represent numbers. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON/ESSENTIAL QUESTIONS:	• How do I use concrete and pictorial models to represent numbers through the thousands?
LAUNCH: PAIR – SHARE (Have kids partner talk during discussion and then share out responses to full class.)	Today we are going to be investigating the number 1000. • How big do you think a thousand is? (PAIR – SHARE) • How big would a box have to be to put 1000 pencils in it? (PAIR – SHARE) • How many classes of 3rd graders would we need to make 1000 students? (PAIR- SHARE) • What are some different ways we could count to 1000? (chart responses; e.g., by 10's, by 50's, by 100's) • Do you think counting by 1's is the best way to count to 1000? Why? MATHEMATICAL NOTE: *Base ten number knowledge results from an ability to count, make groupings, and to understand place value at a deeper level than simply naming places.*
EXPLORE: One-centimeter graph paper (TR57, 3-4 sheets per pair), scissors, glue or tape, crayons or markers, base-ten blocks, coins, 100 charts(TR15), calculators, chart paper (1 piece per group)	Over the next two days we are going to make a picture of 1000 on this chart paper. You and your partner have to figure out how to represent 1000 with one-centimeter squares. You will have to keep track of how many equal groups are needed to make 1000. You also must organize and label the groups clearly so you can convince someone else that there are exactly 1000 squares on your chart. • Pairs of students must cut out from the one-centimeter graph paper exactly 1000 squares and glue or tape them to the large sheet of poster or chart paper, to make a 1000 chart. • They must keep track of how many groups are needed to make 1000. • They must organize and label groups clearly so that any number on the 1000 chart can be located easily. For example, some students may start grouping by 25 and labeling each group of 25 squares with 25, 25, 25…instead of 25, 50, 75…Make sure they understand that they are to label each block of squares with the total so far, not just with the number they are counting by • Let students figure out for themselves how to arrange their blocks of squares on the large paper. • Remind them that they must arrange the squares so that someone looking at their chart could easily count the groups. They should be able to convince someone else that there are exactly 1000 squares

	on their chart when it is finished. NOTE: Some kids will choose to group by 1's, 2's or 5's to make a picture of 1000. They will get frustrated with this tedious task; you can ask guiding questions so they can come up with more efficient groupings. Circulate as students are working, asking questions that will push them to think mathematically about the process they are following. Guiding questions to ask while conferring: • How did you decide to show 1000? • How many squares do you have? • About how many more do you need? • What groupings did you choose to use? Why? • About how many more groups do you need to make 1000? • How are you keeping track of how many groups you need to make 1000? *During the Explore, you should be listening in on conversations and then have some pairs share out during the summary. Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking? (e. g., partners that used the following groupings: 20, 25, 50, 100 – these grouping are efficient in building 1000)*
SUMMARIZE: Connect purpose to activities.	Revisit essential question: *How do I use concrete and pictorial models to represent numbers through the thousands?* Have purposefully selected teams explain their strategies in making their 1000 chart. They will not be finished. **Guiding Questions/Statements:** • How did you get started in making your 1000 chart? • Explain how you organized your chart. • Have you run into any problems while constructing your chart? Explain. • How did you keep track of how many groups were needed to make 1000? • Would you do anything different in creating your chart? Explain? • What are your plans to finish the chart?
PRACTICE/ HOMEWORK **14 note cards**	Alternative Teacher Strategy, TE page 6B.

DAY: 3
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 1: Place Value and Number Sense
LESSON 1.3: Day 2

MATERIALS:	Place value chart for recording on overhead/board, one-centimeter graph paper (TR57 3-4 sheets per pair), scissors, glue or tape, crayons or markers, base-ten blocks, coins, 100 charts (TR15), calculators, , (early finishers: post-its, 10 envelopes)
LESSON FOCUS:	**Understand Numbers to 10,000**
CALIFORNIA STANDARDS:	**Number Sense: 1.3** **1.0**: Understand the place value of whole numbers. **1.1:** Count read and write whole numbers to 10,000. **1.3**: Identify the place value for each digit in numbers to 10,000. **1.5**: Use expanded notation to represent numbers. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• How do I use concrete and pictorial models to represent numbers through the thousands?
LAUNCH: Introduce students to concepts.	We have been investigating 1000 by constructing a thousand chart and doing some homework that dealt with 1000. • What have you learned about the number 1000? (chart students responses) • What is your plan for finishing your 1000 chart? Talk to your partner. You should be listening in on conversations and then have some pairs share out. Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking?
EXPLORE: Same materials as day 1 Early Finishers: slips of paper, 10	Have students continue to construct 1000 charts. Remind students to label their groupings; they should be able to convince someone else that there are exactly 1000 squares on their chart when it is finished. Guiding questions to ask while conferring: • How did you decide to show 1000? • How many squares do you have? • About how many more do you need? • What groupings did you choose to use? Why? • About how many more groups do you need to make 1000? • How are you keeping track of how many groups you need to make 1000? *(During the explore, you should be listening in on conversations and then have some pairs share out during the summary. Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking?)* EARLY FINISHERS: If some students finish early, have them write 10-15 numbers between 1-1000 on individual slips of paper. Place slips of paper in envelopes.

envelopes	They can challenge each other to locate the particular numbers they pull from the envelope on their charts. You can do this whole group after the summary if class finishes. You can call out numbers between 1-1000 and have kids defend their answers. Ask students if thinking about the numbers in expanded form would help them in locating the number on the 1000 chart.
SUMMARIZE: Connect purpose to activities.	**Revisit essential question:** *How do I use concrete and pictorial models to represent numbers through the thousands?* Have purposefully selected student teams explain to the class what their strategies were for making their 1000 chart. Most will have finished. Some students may not be finished, but they may be good candidates to share out why they couldn't complete their chart (maybe they were using an inefficient strategy). **Guiding Questions/Statements:** • How did you complete your 1000 chart? • Did you come up with a new strategy or borrow a strategy from another student in order to complete your chart? Explain. • Explain how you organized your chart. • Did you run into any problems while constructing your chart? Explain. • How did you keep track of how many groups were needed to make 1000? • Would you do anything different in creating your chart? Explain? You can bring out the chart you made in the launch and revisit it. • What do you know about 1000? (chart responses) • How big is 1000? (chart responses)
PRACTICE/ HOMEWORK:	What are two ways you could use your base-ten blocks or pictorial representations of base-ten blocks to build 1000? Draw a picture and write an explanation. Page 8; problem 24, 25, 29

DAY: 4
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 1: Place Value and Number Sense
LESSON 1.4, pp. 10-11 Day 1 of 2

MATERIALS:	Student 1000 charts from previous lessons; Place value chart for board/overhead (TR11), base-ten blocks, hundreds chart (TR 15), chart paper, *How Many Small Squares Sheet* (included at end of this module)
LESSON FOCUS:	**Understand 10,000**
CALIFORNIA STANDARDS:	**Number Sense** **1.0**: Understand the place value of whole numbers **1.1:** Count read and write whole numbers to 10,000 **1.3:** Identify the place value for each digit in numbers to 10,000. **1.5**: Use expanded notation to represent numbers. **Mathematical Reasoning** (standards are embedded)
PURPOSE OF LESSON:	• How do I use concrete and pictorial models to represent numbers through the thousands? • How do I compare the relationships of numbers using **base-ten materials**, number lines and place value charts?
LAUNCH: Materials: place value chart for board or overhead; TR11, ten 1000 charts made from the previous 2 lessons, chart paper, hundreds chart, base-ten blocks; 100's flat and 1000 cube	• How does 100 compare to 1000? (Guide students to look at a hundreds chart or base-ten flat and 1000 cube; you could also incorporate a place value chart.) • How does 1000 compare to 10,000? (Guide students to look at their 1000 charts and/or place value chart.) • After investigating 1000 over the past two days, how big do you think 10,000 is? (chart responses) • How could a place value chart help us to determine how big 10,000 is? • Is there a way we could find 10,000 with the 1000 charts we made? (possible answer: We could add all the charts up to make 10000.) • How many 1000 charts would we need to make 10,000? (Hang the charts in the room sequentially and label them 1000-10,000. e. g.,1000, 2000, 3000….10,000) • How could we use the 1000 charts we made to count to 10,000? (possible answer: We could count by 1000's to 10,000)
EXPLORE: Materials: base-ten blocks, place value charts, 100 chart, 1000 charts made in previous lessons, *How Many Small Squares Sheet* (included at end of module)	Show the *How Many Small Squares?* sheet; students can work with a partner on this problem. • Point to the smallest square. This is the square you will be counting. • Today you will have to figure out: How many small squares are on this paper? • You can use colored pencils, crayons, or markers to help you count the small squares. • Be thinking of efficient ways to count these squares. • If you group the small squares to count, you will have to label the groupings clearly. • Students should be able to convince someone how many small squares are on their sheet when they are done. • Encourage students to find more than one way to count the small squares to check their answer. If students are having a hard time getting started you could say:

	• I am wondering if there are easier ways to count these squares than counting them one by one. Think of some ways to group the small squares? • Do the base-ten blocks we have in our classroom look like something on your How *Many Small Squares Sheet*? • Could the base-ten blocks assist you in counting the small squares? How? • Have students visit a team to borrow a counting strategy? "Get out of your seat and look over somebody's shoulder." *During the Explore, you should be listening in on conversations and then have some pairs share out during the summary. Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking?* Look for the following strategies to share out with whole class: students grouping small squares by 100's, students grouping small squares by 1000's, students using a place value chart to organize groups
SUMMARIZE:	Revisit the Essential Questions: • How do I use concrete and pictorial models to represent numbers through the thousands? • How *do I compare the relationships of numbers using* ***base-ten materials****, number lines and place value charts?* Have purposefully selected student teams explain to the class what their strategies were for counting the small squares. Most will have finished. Some students may not be finished, but they may be good candidates to share out why they couldn't complete counting the small squares (maybe they were using an inefficient strategy). Guiding Questions to ask teams while sharing out: • Did you make a prediction about how many small squares there were before counting? Explain. • What strategies did you use to count the small squares? • What ways did you group the small squares? • How did you keep track of the groups you had while counting? • Did you run into any problems while counting the small squares? Explain. • Did you change your thinking while you were counting the small squares? Question to ask full group. Have kids partner talk before charting responses. • How big is 10,000? How do you know? Responses to listen for: responses including place value, responses that compare 100 to 1000 to 10,000, responses that include quantity, responses that connect this lessons learning to previous days
PRACTICE/ HOMEWORK:	Problem 18, 19 and 21; page 11

DAY: 5
Unit 1: UNDERSTAND NUMBERS AND OPERATION
Chapter 1: Place Value and Number Sense
LESSON 1.4, pp. 10-11 Day 2 of 2

MATERIALS:	Place-value charts (TR11 -1 sheet per team) or they can make their own, spinners and paper clips or digit cards (included in module), paper, digit card sheet (TR11 - 1 per student for homework)
LESSON FOCUS:	**Understand 10,000**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0:** Students understand the place value of whole numbers. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON/ESSENTIAL QUESTIONS:	• How do I compare relationships of numbers using place value charts? • How do I read, write, and identify the value of digits in numbers through 10,000? • How do I connect equivalent representations using place value charts, base-ten materials, expanded notation, and standard notation?
LAUNCH: TR11 (1 sheet per team), spinners and paper clips or digit cards	• Display a place value chart labeled from ones through ten thousands. Students can make individual charts in journals or use the ones from TR11. • Discuss what they know about the chart and what they know about the relationship between the places (e.g., each position is ten times the position to its immediately right). • Divide the students into groups of four. Each pair of students will be a team that plays against the other. Give the groups a spinner to label from 0 – 9 or give the groups the 0 – 9 digit cards.
EXPLORE: TR11 (1 sheet per team), spinners and paper clips or digit cards, paper to rewrite the number as a sum based on the value of the digits (see example)	Students will play a game called **Make it Greatest**. The object of the game is to build a five-digit number that is greater than the opponents' in each round. Three rounds are played to determine a winning team. 1. One team randomly generates a digit from 0 – 9. 2. The team decides which position the digit should be written on their "Place Value" chart and writes it there. A "0" in the ten thousands place is not allowed. Alternate so the other team does the same. 3. After 5 digits have been placed on each chart, the teams must rewrite the number as a sum based on the place value of each of the digits. See example. 4. Play this three times before declaring a winning team who built a larger number more often. *Example*: 90,000 3,000 + 100 20 4 93,124 **Extensions:** • Ask that teams write the number using values other than just the place value positions on their chart (e.g., 90,000 = 80,000 + 10,000). This extension can be used to determine if students understand what numbers such as 90,000 represent. • Have students play the game using 6 digit numbers. (hundred thousands) **Scaffold:** • You can have kids play the game using lesser quantities. For example, have them play the game using only 3 digit numbers (hundreds) or 4 digit number (thousands)

	(During the explore, you should be listening in on conversations and then have some pairs share out during the summary. Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking?)
SUMMARIZE:	**Revisit the Essential Questions:** • *How do I compare relationships of numbers using place value charts?* • *How do I read, write, and identify the value of digits in numbers through 10,000?* • *How do I connect equivalent representations using place value charts, base-ten materials, expanded notation, and standard notation?* Have purposefully selected teams explain to the class what their strategies were for finding a winning number. **Guiding Questions:** • *What did you take into consideration when building your number to make it the largest number possible?* • *What is the largest number possible? How do you know? How far away is yours from it? How can you find out?* • *What strategies would you advise others to use to win this game?* • *What would your number be if you increased/decreased it by 100? 1,000? 100,00? 11,000? Etc.*
PRACTICE/ HOMEWORK: Digit cards sheet (one sheet per student) and place-value chart (TR11)	Play the game at home with someone.

DIGIT CARDS

1	2	3	4
5	6	7	8
9	0	1	2
3	4	5	6
7	8	9	0

DAY: 6
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 2: Compare, Order, and Round Numbers
LESSON 2.1, pp. 18-19

MATERIALS:	Clear jar/large plastic bag with about 50 objects (cubes, tiles, etc.), chapter book
LESSON FOCUS:	**Size of Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0:** Students understand the place value of whole numbers. **Mathematical Reasoning:** **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON/ESSENTIAL QUESTION:	• How do I use benchmark numbers to help develop the ability to estimate and understand the relative magnitude of numbers?
LAUNCH: Introduce students to concepts. Benchmark Scaffold: What numbers are easier to count by? or 5 | 7 10 | 13 25 | 27 50 | 43 100 | 113 What makes the numbers on the left easier? Why would you use them?	Hold up container with approximately 50 objects (interlocking cubes work great): **Ask: *How would you find out <u>about</u> how many (objects) are in this jar?*** Guiding Questions: • What is an estimate? • When might you use an estimate? • Why would you estimate the number of objects instead of counting? Discuss strategies for estimating such as: • Doing a partial count to find the quantity in one group. • Looking at the number of objects in one group, layer, spoonful, cup, ounce, and then counting or estimating the number of groups, layers, spoonfuls, etc., and adding or multiplying to find the total. (using a benchmark) ***Note**: The purpose of this LAUNCH is to help students think about how to estimate, not to find the actual number of objects. You do not need to calculate the number at this time, simply come up with a few strategies.* Put the term "benchmark numbers" on the board and state to the students the following: We call numbers that help us estimate the number of objects without counting them benchmark numbers. Any useful number can be a benchmark. It may also be defined as an amount that gives us a reference to compare to a larger amount.
EXPLORE: Chapter Book (a book from the *Magic Tree House Series* would work well)	**QUESTION:** "If you were being charged by the letter to reprint the first 3 pages of Chapter 1 in your book in gold lettering, how many letters do you estimate you would be charged for? Ask partners to find a way to estimate the number of letters in their book using their own benchmark. Questions to ask while conferring: How did you estimate the number of letters? How did you decide what benchmark to use? Did you change your mind about what benchmark to use? Explain? Can you think of a different benchmark that would be more efficient in estimating? Why would you estimate the number of letters instead of counting them? While conferring with students choose one or two teams to share out during the

	SUMMARIZE. Note: It may be that students use the benchmark of letters in one square inch, one line, or some other way and apply it to the rest of the pages. The purpose of this explore is for students to explore a method, not for you to tell them now to find an estimate. If some students are stuck after a few minutes, stop the class and ask for examples of how others might be approaching the problem. **SCAFFOLD:** Decrease or increase the number of pages to be printed in gold. **EXTENSIONS:** Give a price per letter to reprint the chapter book in gold lettering (e.g., 5 cents a letter, 10 cents a letter)
SUMMARIZE:	Revisit the Essential Question: *How do I use benchmark numbers to help develop the ability to estimate and understand the relative magnitude of numbers?* Choose partners to share with the class their strategy for using a benchmark to answer the question. Partners should show all of their written work as steps they took to estimate the answer. You should choose partners that advance or extend the thinking of the class. Guiding Questions: • Why did you decide to use that benchmark? • How did using a benchmark help you answer the question? • How did you account for any pictures in your book?
HOMEWORK/ PRACTICE:	Explain "benchmark number" to an adult and ask when/how that person uses benchmarks. Have kids solve the problem and write about it: *Casey has a large bag of potato chips. How could she use a benchmark to estimate the total number of chips?* Possible answer: She could count 20 chips, then use these to decide about how many are in the bag. There would be more than one way to solve this.

DAY: 7
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 2: Compare, Order and Round Numbers
LESSON 2.2, pp. 20-23 (Day 1 of 2)

MATERIALS:	Place value chart (TR11), number line sheet (provided at end of module), large unmarked number line (on board, chart or transparency), digit cards (1 sheet per team makes two 0-9 decks; sheet provided in module; you could use the spinner on TR69 with a paper clip – one spinner per team)
LESSON FOCUS:	**Compare Numbers (hundreds; 3 digit numbers)**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0:** Students understand the place value of whole numbers. **1.2**: Compare and order whole numbers to 10,000. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON/ESSENTIAL QUESTION:	• How do I compare the relationships of numbers using base-ten materials, number lines, and place value charts? • How does my understanding of place value help me to develop strategies to order and compare numbers through ten thousand? (only using numbers through hundreds on day 1)
LAUNCH: Large, unmarked number line on board, chart or transparency Check the Helpful Number Line Hints!	**DAY 1 of 2:** Note: Recognize that when comparing numbers, only three possibilities exist: one number is greater than, is less than, or is equal to the other. **Question:** *When do you need to compare numbers or amounts of "things" to know which is greater or less? How do you compare numbers, for example, when you buy something?* • How could we compare two numbers using a number line? • How would I compare the numbers 24 and 32 using a number line? (Have partners discuss and then choose students to give you directions.) • Continue with other examples as needed, using 2- and 3- digit numbers. Locate points on unmarked number line for each example. • How is a number line useful when comparing numbers? Helpful Number Line Hints: • It is important to put an arrow on each side of the number line. This shows that this it is part of the infinite number line. • It is helpful to find the midpoint when determining where to place numbers. • Intervals should be of equal size. • Most likely intervals they will use should be 10's or 100's depending on what numbers they choose.

EXPLORE:

- Place value chart (one sheet per team; TR11)
- Digit cards (1 sheet per team makes two 0-9 decks) or spinners
- Blank number lines (provided in module)

Day 1:

We will be playing the game Make It Greatest like we did 2 lessons ago. Today, the object of the game is to build a **3-digit** number that is greater than the opponent's in each round. Three rounds are played to determine the winning team.

The game is different today. Today you will have to not only put the number in the place value chart (TR110), but will also have to prove what number is greater by comparing them on a number line that you will have to construct. We will be starting with 3 digit numbers.

1. One team randomly generates a digit from 0 – 9.
2. The team decides which position the digit should be written on their "Place Value" chart and writes it there. **A "0" in the hundreds place is not allowed**. Alternate so the other team does the same.
3. After 3 digits have been placed on each place value chart (TR11), the teams must rewrite the number as a sum based on the place value of each of the digits. See example.
4. Then the team will have to compare the numbers to see what number is greater by constructing a number line and placing the numbers on it.
5. Play this three times before declaring a winning team who built a larger number more often.

Example:

$$\begin{array}{r} 100 \\ +\ \ 20 \\ \hline 4 \\ \hline 124 \end{array}$$

Extensions:

- Ask that teams write the number using values other than just the place value positions on their chart (e.g., 90,000 = 80,000 + 10,000). This extension can be used to determine if students understand what numbers such as 90,000 represent.
- Have students play the game using 4 digit numbers (thousands)

Scaffold:

- You can have kids play the game using lesser quantities. For example, have them play the game using only 2 digit numbers (tens)
-

Questions to use while conferring with teams of players:

- *What did you take into consideration when building your number line to prove what number was the greatest/least?*
- *How did using a number line help you compare two numbers?*
- *How did using a number line help you order two numbers from least to greatest?*
- *What strategies would you advise others to use when placing numbers on a number line?*

SUMMARIZE:	Revisit Essential Questions: • How do I compare the relationships of numbers using base-ten materials, number lines, and place value charts? • How does my understanding of place value help me to develop strategies to order and compare numbers through ten thousand? (only using numbers through hundreds on day 1) Have purposefully selected teams explain to the class what their strategies were for comparing their numbers on number lines to determine what number was greatest? **Guiding Questions:** • *What did you take into consideration when building your number line to prove what number was the greatest?* • *How did using a number line help you compare and order two numbers?* • *What strategies would you advise others to use when placing numbers on a number line?* • *How did you determine what intervals to use on your number line?* • *Are there other ways you could prove what number is greatest/least?*
PRACTICE/ HOMEWORK:	Day 1: Link Up to Reading, p. 23.

DAY: 8
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 2: Compare, Order and Round Numbers
LESSON 2.2; pp. 20-23 (Day 2 of 2)

MATERIALS:	• Place value chart (TR11) • Number line sheet (provided at end of this module) • Large, unmarked number line (on board, chart or transparency) • Digit cards (1 sheet per team makes two 0-9 decks; sheet provided in module; you could use the spinner on TR69 with a paper clip – one spinner per team)
LESSON FOCUS:	**Compare Numbers: thousand (4 digit number) and ten thousand (5 digit number)**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0:** Students understand the place value of whole numbers. **1.2**: Compare and order whole numbers to 10,000. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON/ESSENTIAL QUESTION:	• How do I compare the relationships of numbers using base-ten materials, number lines, and place value charts? • How does my understanding of place value help me to develop strategies to order and compare numbers through ten thousand?
LAUNCH: Large, unmarked number line on board, chart or transparency Check the Helpful Number Line Hints!	**DAY 2 of 2:** Note: Recognize that when comparing numbers, only three possibilities exist: one number is greater than, is less than, or is equal to the other. During the previous lesson would played *Make It The Greatest*. How is a number line useful when comparing numbers? (Have kids partner talk and then select some kids to share out their explanations.) • How would you compare the numbers 2,450 and 9,500 using a number line? (Have partners discuss and then choose students to give you directions on how to place the numbers on a blank number line) • Where would our number line begin? Why? Where would our number line end? Why? • Continue with other examples as needed, using 4 digit numbers. • Helpful Number Line Hints: • It is important to put arrows on each side of the number line. This shows that this it is part of the infinite number line. • It is helpful to find the midpoint when determining where to place numbers on a number line. • Intervals should be of equal size. • Most likely intervals they will use should be 10's or 100's depending on what numbers they choose.

EXPLORE:

- Place value chart (one sheet per team; TR11)
- Digit cards (1 sheet per team makes two 0-9 decks) or spinners
- Blank number lines (provided in module)

Day 2 of 2:

We will be playing the game Make It Greatest like we did in the previous lesson. Today, the object of the game is to build a **4-digit** number (instead of a 3-digit number) that is greater than the opponent's in each round. Three rounds are played to determine the winning team.

Today, you will still you will have to put the number in the place value chart (TR11) and will still have to prove what number is greater by comparing them on a number line that you will have to construct. Remember you will be using 4 digit numbers.

1. One team randomly generates a digit from 0 – 9.
2. The team decides which position the digit should be written on their "Place Value" chart and writes it there. **A "0" in the thousands place is not allowed**. Alternate so the other team does the same.
3. After 4 digits have been placed on each place value chart (TR11), the teams must rewrite the number as a sum based on the place value of each of the digits. See example.
4. Then, the team will have to compare the numbers to see what number is greater by constructing a number line and placing the numbers on it. (use sheet provided have kids make their own)
5. Three rounds are played to determine the winning team. What team made the greatest number more often wins.

Example:

$$\begin{array}{r} 4000 \\ 100 \\ +\ \ 20 \\ \ \ \ 4 \\ \hline 4{,}124 \end{array}$$

Extensions:

- Ask that teams write the number using values other than just the place value positions on their chart (e.g., 90,000 = 80,000 + 10,000). This extension can be used to determine if students understand what numbers such as 90,000 represent.
- Have students play the game using 6 digit numbers (hundred thousands)
- Change the title of the game to Make It the Least; the player with the least number wins.
- Have the students play using 5 digit numbers (10,000's).

Scaffold:

- You can have kids play the game using lesser quantities. For example, have them play the game using only 3 digit numbers (hundreds)

Questions to use while conferring with teams of players:

- *What did you take into consideration when building your number line to prove what number was the greatest?*
- *How did using a number line help you compare two numbers?*
- *How did using a number line help you to order numbers from least to greatest?*
- *What strategies would you advise others to use when placing numbers on a number line?*

SUMMARIZE: Connect purpose to activities.	**Revisit Essential Questions:** • *How do I compare the relationships of numbers using base-ten materials, number lines, and place value charts?* • *How does my understanding of place value help me to develop strategies to order and compare numbers through ten thousand*? Have purposefully selected teams explain to the class what their strategies were for comparing their numbers on number lines to determine what number was greatest? **Guiding Questions:** • *What did you take into consideration when building your number line to prove what number was the greatest?* • *How did using a number line help you compare two numbers?* • *How did using a number line help you order two numbers?* • *What strategies would you advise others to use when placing numbers on a number line?* • *How did you determine what intervals to use on your number line?* • *Are there other ways you could prove what number is greatest?*
PRACTICE/ HOMEWORK: Materials; place value charts (one sheet per student; TR11), digit cards (1 sheet per student)	Day 2 - Take the game home and teach it to someone; play at least 3 rounds.

DAY: 9
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 2: Compare, Order and Round Numbers
LESSON 2.4, pp. 24-25

<table>
<tr><td>MATERIALS:</td><td>Large unmarked number line (class chart/transparency),number Line sheet (provided at end of module) or have kids make their own, base-ten blocks</td></tr>
<tr><td>LESSON FOCUS:</td><td>Order Numbers and Problem Solving: Identifying Relationships</td></tr>
<tr><td>CALIFORNIA STANDARDS:</td><td>Number Sense:
1.0: Students understand place value of whole numbers.
1.2: Compare and order whole numbers to 10,000.
Algebra and Functions
1.2: Solve problems involving numeric equations or inequalities.
Mathematical Reasoning: (standards are embedded0</td></tr>
<tr><td>PURPOSE OF LESSON:</td><td>• How can my understanding of place value help me develop strategies to order and compare numbers through ten thousand?
• How do I compare the relationships or numbers using base-ten materials, number lines, and place value charts?</td></tr>
<tr><td>LAUNCH:</td><td>Task: Ask students to write these numbers in order from least to greatest on a piece of paper. Students can work alone.

629 296 962 692

Note: While this is only a brief review of place value, the emphasis is on comparing numbers by understanding the value of the digits depending on their position in a number. The conversation should push students to make decisions about the order of numbers based on value.

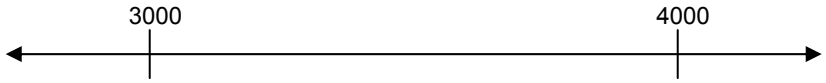
Ask:
• What did you consider before deciding on an order?
• What is the value of the ‘6’ in each? The ‘2’? The ‘9’? How does this matter?
• What can you tell me about the place value of each of those digits?
• What strategies could you use to order the numbers from least to greatest or greatest to least? (place value chart, base-ten representations of numbers, number line)</td></tr>
<tr><td>EXPLORE:

1 piece of chart paper for every group of two students so they have room to solve the problem in a variety of ways</td><td>Reproduce this table on transparency, chart or board (modified table from SE page 26):

Names of Mountains
<table><tr><td>Mount Leatrice</td><td>1,999 ft</td></tr><tr><td>Mount Ivan</td><td>703 ft</td></tr><tr><td>Mount Tom</td><td>853 ft</td></tr><tr><td>Matterhorn Peak</td><td>1,500 ft</td></tr></table></td></tr>
</table>

	Present the following Task to the Students (write this problem on board, chart or transparency have students work with a partner): *While on vacation, Nancy and Emilio saw Mount Leatrice, Mount Ivan, Matterhorn Peak, and Mount Tom. They want to hike to the mountain that is higher than Mount Ivan but not as high as Matterhorn Peak. Which one should they choose?* Students must solve this problem and **prove their answer 2-3 different ways**. (You may see students proving their answers by: ordering the numbers on a number line, representing the numbers using base-ten blocks, comparing the digits in the same place-value positions by using a place value chart or another way) *During the Explore, you should be conferring with students while they are solving this problem, be looking for teams to share out during the summary. Be purposeful about the students you select to share out. How will the students you select to share out move the class closer to meeting the math goals for this lesson? Is there a student that would extend/advance the class's thinking?* Guiding Questions while you are conferring: • How did you approach the problem? • What strategies are you using to order the numbers? • How can you check your answer to see if it is correct? (Remind students about previous lessons in which they ordered and compared numbers.)
SUMMARIZE:	**Revisit the Essential Questions:** • *How can my understanding of place value help me develop strategies to order and compare numbers through ten thousand?* • *How do I compare the relationships or numbers using base-ten materials, number lines, and place value charts?* Have purposefully selected teams of students explain their strategies for solving the problem, Guiding Questions: • How did your team approach the problem? • What strategies did you use to order the numbers? • How did you check your answer to see if it was correct? • What do you know about ordering numbers?
PRACTICE/ HOMEWORK:	Problems 4, 5, and 10: SE page 27

DAY: 10
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Module 3 Chapter 2: Compare, Order and Round Numbers
LESSON 2.5, 2.6, pp. 28-31 (Day 1 of 2)

MATERIALS:	Large, unmarked number line (transparency/class chart), 1 piece of notebook paper for each student, 5 small pieces of paper for all students (post-it notes work great)
LESSON FOCUS:	**Round to Nearest 1,000**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0:** Understand place value of whole numbers. **1.3:** Identify the place value for each digit in numbers to 10,000. **1.4** Round off numbers to 10,000 to the nearest ten, hundred, and thousand. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• What are strategies I can explain and use for rounding numbers to ten thousand? • How can my understanding of place value help me develop strategies to order and compare numbers through ten thousand?
LAUNCH: Introduce students to concepts.	Write the number "3,453" on the board. • Draw a blank number line on a chart with two endpoints labeled "3000" and "4000" and label it "Nearest Thousand".  **Question: On a number line from "3000" to "4000", where would this number fall? Is that point closer to "3000" or "4000"? Explain how you know? (Circle the "3000" after the students use it.)** • Draw a second number line but change the endpoints to "3400" and "3500" and label it "Nearest Hundred". Ask the same question using the new endpoints. Circle the "3,500". • Draw a third number line and change the endpoints to "3,450" and "3,460" and label it "Nearest Ten". Ask the same question using the new endpoints. Circle the "3,450". Explain to the class that this is how people **round numbers** to the nearest "1,000", "100", and "10". Discuss with students that **rounding** is a means of changing a number to a friendlier number so that some computation can be done more easily. They will use this skill later when they are estimating sums and differences. Often the friendliest numbers are the numbers with the most zeros. ***Keep these number lines posted as a reference for children; you will use this chart for the next lesson.**

EXPLORE: This explore will be guided so as to provide a scaffold for students. Materials: 1 piece of paper for student (8.5 X 11), 5 small pieces of paper for each student (post-it notes work great)	**Folding Number Lines and Rounding** Today we are going to construct some number lines together. Think of the lessons from the previous days to help you. Then, we are going to challenge each other with some problems. NOTE: Folding number lines can be saved and reused routinely. Directions (make number lines with students): 1. Use blank sheet of paper and fold it in the middle vertically. 2. Open paper and lay flat. 3. Draw three number lines about 1 1/2 inches apart, underneath each other across paper, leaving a very small margin at each end. (Demonstrate.) 4. Make point at middle of top number line (midpoint) and label it 50. 5. Make point at middle of second number line (midpoint) and label it 500. 6. Make point at middle of bottom number line (midpoint) and label it 5,000. 7. Label endpoints on top number line “0 and 100”. 8. Label endpoints on second number line “0 and 1000”. 9. Label endpoints on bottom number line “0 and 10,000”. Write the number 54 on the board. Ask the following questions: • What number line would you place the number 54? Why? Does anyone have another way to explain why? • On this number line from “0 to 100”, where would this number fall? Why? Can anyone explain it a different way? • Is that point closer to “0” or “100”? Explain how you know. • What number would we round 54 to? Write the number 501 on the board. Ask the following questions: • What number line would you place the number 501? Why? Does anyone have another way to explain their reasoning? • On this number line from “0 to 1000”, where would this number fall? Why? • Is that point closer to “0” or “100”? Explain how you know. Can anyone explain it a different way? • What number would we round 501 to? Write the number 5750 on the board. Ask the following questions: • What number line would you place the number 5750? Why? Does anyone have another way to explain their reasoning? • On this number line from “0 to 10,000”, where would this number fall? Why? • Is that point closer to “0” or “10,000”? Explain how you know. Can anyone explain it a different way? • What number would we round 5750 to? • What pattern do you notice with the numbers we just rounded? • Continue with similar questions using the numbers “10, 48 and 4,999”. Then ask what patterns they notice when rounding these numbers. • How are the numbers 50, 500, and 5,000 rounded? Have them explain what they think.

	Note: You will have to tell them that when we round a number that is exactly the midpoint between two numbers, we always round up to the higher amount. • Why do you think we do that? When you are finished constructing number lines: (if you have time) • Students each write 5 or 6 numbers on 5 or 6 small pieces of paper for partners to locate on each number line. • Partners exchange papers and locate each other's numbers. Partners then round each number as follows: Round numbers on top line to nearest 10. Round numbers on middle line to nearest 100. Round numbers on bottom line to nearest 1,000. Return partners' papers and go over. Share with class. **In any time remaining, go around class saying numbers to be rounded to nearest 10, 100, or 1,000 (e.g., nearest 10 for the number 9; nearest 100 for the number 549; nearest 1,000 for the number 9,499).**
SUMMARY	**Revisit the Essential Questions:** • *What are strategies I can explain and use for rounding numbers to 10,000.* • *How can my understanding of place value help me develop strategies to order and compare numbers through the ten thousands.* Have purposefully selected teams of students share out their strategies for solving the problem their partners game them. Guiding Questions: • How did you decide what number line to place your number on? • How did you decide where to place your number on the number line? • How did you decide whether your number was closer to the higher or lower number? • Why do you think we round numbers? • If you had to teach someone to round numbers what would you say? • Would this strategy always work? Why do you think this is the case?
PRACTICE/ HOMEWORK	Problems 27-30; SE page 29

DAY: 11
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 2: Compare, Order and Round Numbers
LESSON 2.5 & 2.6, pp. 28-31 (Day 2 of 2)

MATERIALS:	• Large, unmarked number line. • Chart paper (1 piece per team of 2 kids) or 11x17 paper
LESSON FOCUS:	**Rounding Numbers using Number Lines**
CALIFORNIA STANDARDS:	**Number Sense:** **1.3:** Identify the place value for each digit in numbers to 10,000. **1.4**: Round numbers to 10,000 to the nearest 10, hundred, and thousand. **1.0:** Understand place value of whole numbers **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• What are strategies I can explain and use for rounding numbers to ten thousand? • How can my understanding of place value help me develop strategies to order and compare numbers through ten thousand?
LAUNCH: chart paper	Take a look at the number lines you made in the prior lesson's launch. Ask: What do you know about rounding numbers? (chart responses) Why would you round numbers? (chart responses) **Present a Problem:** *A theater had to sell **at least** 2,000 tickets for a new play. One box office sold 159 tickets, another sold 331, and a third sold 1117. Did they sell **about** 2,000 tickets for the play? How can you find out **quickly?*** • Discuss. How can you use "rounding" to determine if they are close to 2,000? How do you know it's reasonable? • If students used a number line, ask students to identify endpoints (e.g., 100 and 200 for 159; 300 and 400 for 331, 1000 and 2000 for 1117). • When all three rounded numbers are recorded, students add and decide if at least 1,000 tickets were sold. Highlight that an estimate **<u>isn't</u>** rounding after doing the actual operation. Why do you think we round numbers? Have kids partner talk and then select some students to share out that will advance or extend the classes thinking?
EXPLORE: Large sheets of paper (11x17 or chart paper)	Refer to SE Harcourt p. 31 (14 & 18) **Task: Make number lines that show how you can round "3,581" and "4,624" to the nearest thousand, hundred, and ten. (You may just want to round one number instead of two; make sure you have 15 to 20 minutes for the summary.)** • Group students as partners. • Ask students to create number lines that resemble the ones from the prior lesson's LAUNCH (use the chart as a scaffold). • Ask students to discuss with their partners how they will decide what "friendly number" they will round to. Students need to place the number on the number

	line and circle the endpoint the number is closer to. They must write and explanation for their choice. **Note:** If there are students having difficulty with this task, you may want to stop the class at some point and ask if there are any strategies students are using that helped with the task above. **Scaffold and Extension:** • Decrease or Increase the size of the numbers. • Decrease or Increase the place value to which students are rounding.
SUMMARIZE: Have children show and explain their charts.	**Revisit the Essential Questions:** • *What are strategies I can explain and use for rounding numbers to 10,000.* • *How can my understanding of place value help me develop strategies to order and compare numbers through the ten thousands.* Have purposefully selected teams of students share out their strategies for solving these problems. Guiding Questions: • How did you determine which two numbers to place as endpoints in each of your number lines? • How did you decide whether your number was closer to the higher or lower number? • Would this strategy always work? Why do you think this is the case?
PRACTICE/ HOMEWORK:	Problems 22-24; SE page 31

DAY: 12
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Module 3: Chapter 3: Addition
LESSON 3.1, pp. 36-37

MATERIALS:	Chart paper, 11 x 17 sheets of paper (1 per student or every two students)
LESSON FOCUS:	**Using the Associative Property to add**
CALIFORNIA STANDARDS:	**Number Sense:** **1.0:** Students understand the place value of whole numbers. **2.1:** Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions** **1.0:** Select appropriate symbols, operations, properties to represent, describe, simplify, and solve simple number relationships. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON/ESSESTIAL QUESTION:	• How do I use the Associative Property of addition to add 2- and 3- digit numbers?
LAUNCH:	What do you know about addition? (chart responses) Guiding Questions during the launch (you may want to include partner talk before you select kids to share out their thinking): • Ask what happens when you add? • Why do you think that? • What have you learned about addition so far? • How does addition relate to subtraction? • What are some different examples of addition problems? Write the term ***Associative Property of Addition*** on the board/chart. Today we are going to investigate what the associative property of addition is.
EXPLORE: This EXPLORE will resemble a number talk. Paper and pencil for every student	**Mathematical Note**: The Associative Property of Addition - It is common for students to add 3 or more numbers without explicitly thinking about how they are grouping the numbers in order to add them. Most students do not think about the fact that they actually are adding numbers two at a time. As a consequence, they often do not come up with a specific conjecture about how they can group numbers to add three or more of them. It often takes some effort to get students to recognize the associative property of addition which involves three or more numbers. Present the following problems. (These number sentences were designed to make the associative property of addition an explicit focus of attention. Students can solve the problems any way they would like. Have them share their strategies with a partner): 56 + 75 + 25 = __ 20 + 13 + 10 = __ 98 + 6 + 2 = __

	Have kids work alone to solve the problem and then share strategies with a partner. When students are finished with the problems, gather them together to discuss. Guiding questions to ask while conferring with groups (guiding questions should emphasize the **grouping of addends,** since that is the big mathematical idea this lesson focuses on): • How did you approach that problem? • How did you get that answer? • Could you group the addends another way when you add? Try it. • What happens to the sum if you group the addends in a different way when you add? While you are conferring with students look for students to share strategies in the summary that will advance or extend the classes thinking about the associative property of addition.
SUMMARIZE: (This summary will run quite long and is essentially a number talk)	**Revisit the Essential Question**: • *How do I use the Associative Property of addition to add 2- and 3- digit numbers.* Have purposefully selected students share their answers. In the process of discussing the example, it becomes necessary to have a notation to make explicit which numbers are being added first, **you will introduce parentheses as a notation** to show the order in which calculations are carried out. *When students discuss what numbers they added first you may say something like this, "When mathematicians want to group numbers together to show how they want to combine them, they use parentheses. [Here is how they would show what the first student did: 56 + (75 + 25) = 156. And here is how they would write what the second student did: (56 + 75) + 25 = 156.] You always add what is in the parentheses first.* During this discussion be explicit about the mathematics. Why do the strategies work? <u>Example – Guiding the Share-Out:</u> **Scenario 1:** 56 + 75 + 25 = __ <u>Student's Explanation</u>: "I added the 75 and 25 together first and then I added the 56." <u>Possible Teacher Response</u>: " You said you added 75 and 25 together first; why did you group the numbers in that way? Would the sum of the three addends change if you group the addends in a different way? How do you know? How could you prove this conjecture? **Scenario 2:** 56 + 25 + 25 =__ <u>Student's Explanation:</u> "I added the 56 and 25 together first and then I added the 25."

	Possible Teacher Response: "You said you added 56 and 25 together first; what is different in the way you grouped the numbers than the first student? Both students added the numbers differently, but what do you notice about the sum? What could we say about this? Can you always group addends in multiple ways when you add 3 or more numbers? Why? Can you show me some more examples to prove it? At this point you may want to look at some of the other problems students explored and use parentheses to distinguish between the different solutions. After some discussion, the class comes up with a conjecture about the ASSOCIATIVE PROPERTY of ADDITION. (chart conjecture and discuss) You may ask: What do we know about adding 3 or more numbers? *Associative Property of Addition: When you add three numbers, it does not matter whether you start by adding the first pair of numbers or the last pair of numbers. This can be represented symbolically as (a + b) + c = a + (b + c)*
PRACTICE/ HOMEWORK:	Provide similar examples to the EXPLORE problem. Choose addends that seem logical to group. SE problems 5-19, page 37

DAY: 13
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 4, Subtraction (Algebra Expressions and Number Sentences)
LESSON 4.6, pp. 68-69 (Day 1 of 2)

MATERIALS:	paper and pencil for every student
LESSON FOCUS:	**Algebra: Expressions and Number Sentences**
CALIFORNIA STANDARDS:	**Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Number Sense:** **2.1**: Find the sum and difference of two whole numbers between 0 and 10,000. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH: .	Begin the lesson by explaining that an expression is a part of a number sentence. It combines numbers and operation signs; it does not have an equal sign, such as 4 + 5 (Harcourt SE pg. 68). • Ask students for similar examples. An equation is a number sentence which states that two amounts are equal such as 4 + 5 = 9. (see Equality Routine) • Ask students for similar examples. Today students will be challenged to find different ways to express a particular number.
EXPLORE:	Challenge students to find different ways to **express** a particular number. You may say something like this, "How many names can you find for the number 50 using only numbers less than 10 and at least two operations? (Multiplication, addition, subtraction)?" You may want to ask students to give you a couple of examples before sending them off to work. They should work alone for 10-15 minutes and then they can share their expressions with a partner. They should check to see if their partner wrote any false equations. **Scaffold/Extension**: Change the quantity of the number. (e.g., change the number 50 to 10 or change the number 50 to 100) **Mathematical Note:** "*In the expression **3B + 7 = B – C**, the equal sign means that the quantity on the left is the same as the quantity on the right. To understand expressions in this way, students must interpret simple arithmetic expressions such as **3 + 5 or 4 x 87** as single quantities. Unfortunately student tend to look on expressions such **as 3 + 5 or 4 x 87** as commands or things to do. As students read left to right in an equation, the = tells them, "Now give the answer." Because of this "get an answer" view of operations and equal signs,*

	*students fail to think of **5 + 2** as another way to write **7**.")* - Van De Walle pg. 430 (see Equality Routine) Possible questions while conferring with students: • How do you know if your equation is true? • How could write an equation with two expressions? (e.g., 25 + 25 = 75 – 25) • Do you notice a pattern in your expressions? • Can the answer to your equation go on the left of the equal sign? Why is that possible? (e.g. 50 = 25 + 25) • How could you incorporate parentheses into an equation to make it true? • How do you know if your partner wrote a false equation? Can you find any? As you are conferring select students that will extend or advance the thinking of the class. You may want to look for the following: expressions with two or more operations, expressions that incorporate parentheses, expressions that have a pattern (e.g. 49 + 1, 48 + 2, 47 + 3, etc.), equations that use two expressions
SUMMARIZE:	**Revisit the Essential Questions:** • *How do I write expressions that represent situations?* • *How do I select operational symbols to make number sentences true?* Have selected students share out their expressions/equations. Make sure selected students advance or extend the thinking of the class. Guiding Questions: • *How do you know if your equations are true?* • *How* could you write an equation using two expressions? (e.g., *25 + 25 = 75 – 25*) • *Do you notice a pattern in your expressions?* • *Can the answer to your equation go on the left of the equal sign? Why does that work? (e.g. 50 = 25 + 25)* • *How could you incorporate parentheses into an equation to make it true?* • *How do you know if your partner wrote a false equation? Can you find any?* • *What is an expression? (chart)* • *What is an equation? (chart)* • *Have* we found out anything new about addition and subtraction? (chart)
PRACTICE/ HOMEWORK:	How many ways can you **express** the number 100 using only numbers less than 10 and at least two operations? (Multiplication, addition, subtraction) Have them consider what they learned from today's lesson.

DAY: 14
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 4: Subtraction (Algebra: Expressions and Number Sentences)
LESSON 4.6, pp. 68-69 (Day 2 of 2)

MATERIALS:	Paper and pencil, text book for explore problems
LESSON FOCUS:	**Algebra: Expressions and Number Sentences**
CALIFORNIA STANDARDS:	**Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Number Sense:** **2.1**: Find the sum and difference of two whole numbers between 0 and 10,000. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH:	Refer to last night's homework. Students were to express 100 in a variety of ways. Have students share expressions/equations. Guiding questions: • What is an expression? • What is an equation? Today you will be looking at some problems in context (word problems) and you will have to write an expression for each. After you write the expression you will write an equation (number sentence). Please solve the problem any way you wish.
EXPLORE:	Have students write expressions for the following problems: (students may work with a partner) SE page 69; problems 1, 2, 7, 8 Guiding questions while conferring with partners: • What words let you know what operation to use in your expression? • How can you write the expression another way? • How do you make an expression an equation (number sentence)? • How do you know your equation is true? • How is an equation different than an expression? While conferring with students select students to share out in the summary that will extend or advance the learning of the class.
SUMMARIZE:	Revisit Essential Questions: • How do I write expressions that represent situations? • How *do I select operational symbols to make number sentences true?* Guiding Questions: (talk about 1 or 2 problems in depth) • How do you know what operation to use in your expression? • How can you write the expression another way? • How would you make an expression an equation?

	• How do you know your equation is true? Pose the following problem to the group on chart/board/overhead. • If I give you this expression: 30 + 50 How could you put this problem in context (write a word problem)? Have kids partner talk and then share solutions. Have students share responses (chart): • How did you choose words to match your expression? • Are there other ways to add context to this expression? • How do you know your equation is true?
PRACTICE/ HOMEWORK	Problem 21, SE page 69

DAY: 15
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Module 3: Chapter 3: Addition Chapter 4: Subtraction
LESSON 3.2 & 4.1, pp. 38-39, pp. 52-71

NOTE: This module has lessons constructed from chapter 3 and chapter 4 combined, as to make lessons more problematic. Addition and subtraction are related and should not be taught in isolation. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use, make meaning of the operations and they will also get opportunities to make connections and see relationships between the operations.

MATERIALS:	large number line for class to see, individual student number lines, base-ten blocks
LESSON FOCUS:	**Estimate Sums and Differences**
CALIFORNIA STANDARDS:	**Number Sense: 1.0, 1.3, 2.8** **2.1**: Find sum or difference of two whole numbers between 0 and 10,000. **1.4:** Round numbers to 10,000 to the nearest 10, 100, and 1,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning**: (standards are embedded)
PURPOSE OF LESSON/ESSENTIAL QUESTION:	• How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH:	Put the following problem on chart paper/board/overhead (Have students independently think of an estimate or compute mentally, and then list these "pre-answers" on the board. Have students explain their reasoning to a partner): *I have 19 paper clips in my right hand and 28 in my left hand. How many paperclips do I have in both hands?* Pick a few students to share their strategies/estimates. You may want to pick a student that that had an estimate that was completely off mark. This error may be a vehicle for rich discussion. Possible guiding questions: • Do you think the answer is greater than 50 paperclips or less than 50 paperclips? Why? • How do you know if your answer is reasonable? • Why do we estimate answers when adding or subtracting two numbers? • How did you approach the problem? • How could you use a number line to help you round numbers in order to estimate? Scaffold: Alternative Teaching Strategy, TE p. 38B (guide students to look at numberline) NOTE: When the task is aimed at the development of a computational procedure, a

	useful *before* action is to have students actually do the computation mentally or suggest a ballpark answer. Students should be estimating to check the reasonableness of an answer.
EXPLORE: Materials: individual number lines, base-ten blocks	Put the following problems on the board/chart/overhead. Ask students to solve one set of problems alone and share strategies with a partner. Each set contains an addition and subtraction problem. Give pairs of students different sets so both sets of problems will have been solved for discussion in the summary. Have them make an **estimate before solving**. Students should be able to articulate the strategies they used for estimating. SET ONE -make an estimate first 1. *Josh put 21 heads of lettuce in each basket to feed to the manatees. About how many heads of lettuce would there be in 3 baskets? (problem 20, SE page 20)* 2. *There were 316 people seated in the auditorium that can seat 499. About how many more people can be seated in the auditorium? (Problem Solving 4.1, TE pg. 55 – bottom of page)* SET TWO - make an estimate first (this set is more challenging) 3. *Erica earned $2.90 on Monday. If she earns about the same amount Tuesday and Wednesday, can she buy a $13.00 CD? (problem 21, SE pg. 39)* 4. *The difference between two numbers is about 200. One number is 671. Which number could be the other number? (Problem Solving 4.1, TE pg. 55)* Possible guiding questions while conferring with students. • How did you estimate before you began your calculation? • How did you approach the problem? • How did you decide if your answer was reasonable? • Describe a way you can estimate sums or differences of numbers before adding? • Why is estimation a useful strategy when adding or subtracting? While you are conferring with students look for students to share strategies in the summary that will advance or extend the classes thinking about estimating sums or differences.

SUMMARIZE:	Revisit the Essential Question: • How do I use estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How *do I select operational symbols to make number sentences true?* Have purposefully selected students share their answers/strategies for approaching the problems. Make sure you have time to talk about both sets of problems. Possible Guiding Questions: • How did you approach the problem? • How did you decide if your answer was reasonable? • Is estimating money different from estimating the sum? • What are some different ways we can estimate sums or differences of two or more numbers? • Why is estimation a useful strategy when adding or subtraction two or more numbers? (chart responses) • What are all the different ways we could estimate sums or differences? (chart responses) • What are some similarities/differences when estimating sums or differences?
PRACTICE/ HOMEWORK:	SE problems 22-25, page 39

DAY: 16
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 3 & 4: Addition and Subtraction
LESSON 3.3 – 4.6

NOTE: This module has lessons constructed from chapter 3 and chapter 4 combined, as to make lessons more problematic. Addition and subtraction are related and should not be taught in isolation. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use, make meaning of the operations and they will also get opportunities to make connections and see relationships between the operations.

MATERIALS:	Number lines, base ten blocks for each pair of students, counters, large paper to make a pictorial representation (11 X17)
LESSON FOCUS:	**Adding and Subtracting Multi-digit Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded) **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON:	• *How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH:	**Mathematical Note:** It will be important to have students estimate all sums or differences (for reasonableness) prior to calculating. This strategy was focused on in the prior lesson and should be used throughout this module and throughout the year. "It is a serious error to work for mastery of non-regrouping problems before tackling regrouping. To keep these problems separate has been the documented source of many error patterns. Teaching non-regrouping problems first causes bad habits that children must later unlearn. If you develop traditional algorithms in a problem-solving manner, there is no reason why your students should not be expected to understand them!" -*Van De Walle, page 211* **Questions:** Write 125 + 125 on board/overhead. • How do you add 125 + 125**?** • Discuss different approaches/procedures. (chart responses) • Ask if there are any other ways. Accept and discuss a variety of strategies. Value all strategies equally. (students may use the following strategies: regrouping, ten-frame adding, adding tens and hundreds; e.g. 100 + 100 + 20 + 20 + 5 + 5; Van De Walle pg. 206)

	• Ask if different addition strategies always give the same answer. Why?.
EXPLORE: **Note to teachers:** Please keep an ongoing chart of addition and subtraction strategies so you and your students can refer to them. Materials: Number lines, base ten blocks for each pair of students, counters, large paper to make a pictorial representation	You could say something like this when you introduce the problems, "*We have talked about some different strategies when adding numbers. I wonder if you use similar strategies when you subtract numbers? Feel free to use the chart we constructed together as a reference for solving the following problems. We will add strategies to this chart as we investigate addition and subtraction. Be thinking about how addition and subtraction are related as you are solving the following problems. Be thinking about what you are learning about addition and subtraction."* Present the problems and have children work alone. When they are finished they can share their strategies with a partner. They should have a number sentence for both problems they solve. **Scaffold (before solving):** You may want to brainstorm strategies as a class briefly before setting the class off to solve the problem. Their suggestions will not solve the problem for others because students must still work out the solution and explanation. *–Van De Walle, page 43* There are two sets of problems. Set 2 more challenging than Set 1. Make sure that all problems are solved for the discussion in the summary. <u>Set 1</u> - Make an estimate first 1. Michael has 125 stamps in his stamp collection. Brice collected 20 more stamps than Michael. Keith has 154 stamps. How many stamps do the boys have all together? (adapted from Problem Solving 4.3 – problem 6, TE 59, bottom of the page) 2. A hot air balloon was at 1,025 feet above the ground. Then it rose to 1,920 feet above ground. How much higher is it now? (Learn problem SE page 62) <u>Set 2</u> – Make an estimate first (this set is more challenging) 3. Pedro charges $14 to mow a lawn and $6 to do the edging. If Pedro mowed two lawns every day for a week and edged one lawn every day for a week, how much did he earn? (adapted from Problem Solving 3.6 – problem 4, TE 47, bottom of the page) 4. Sheli's mother was born 25 years before 1987. How old was Sheli's mother in 2000? (problem 39, SE page 65) Guiding questions while conferring with students: (Pick out a few students to share our during the summary. These students should advance or extend the learning of the class) • How did you estimate before you began your calculation? • How did you approach the problem? • How did you decide if your answer was reasonable? • What number sentence did you use to solve the problem? • What strategy did you use when solving the problem? Why does it work? • How would you explain your strategy to a partner? • Could you use a different strategy to solve the problem and prove your answer? • Why do you think you could use more than one strategy to solve your problem? • Can you describe some relationships you have noticed between addition and subtraction?

SUMMARIZE	**Revisit the Essential Questions:** • * How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I estimate the sum and difference between two numbers and to check the *reasonableness of an answer?* Have purposefully selected students share their answers/strategies for approaching the problems. Make sure you have time to talk about both sets of problems. Focus on children's invented procedures. The focus is not on the standard algorithm. During this discussion it will be important to ask questions so that children can connect one strategy to another in order to make deeper meaning. Do not TELL them how the strategies connect. Furthermore, it will be important for the conversation to revolve around why strategies work. Guiding Questions: • How did you estimate before you began your calculation? • How did you approach the problem? • How did you decide if your answer was reasonable? • What number sentence did you use to solve the problem? • Did anyone use a different number sentence to solve the problem? Explain. • What was your strategy for adding and subtracting numbers? Why does it work? • Did anyone use a different strategy to solve the problem and arrive at the same answer? • How does one student's strategy relate to another student's strategy? • Why do you think you could use more than one strategy to solve your problem? • Can you describe some relationships you have noticed between addition and subtraction? **Mathematical Note:** For more information on tips for learning multi-digit addition and subtraction turn to page 23 of The Mathematics Source Book ; Editied by Debra Coggins.
PRACTICE/ HOMEWORK	Problems 10 & 11, SE page 41.

DAY: 17
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 3 & 4: Addition and Subtraction
LESSON 3.3 – 4.6

Note: This module has lessons constructed from chapter 3 and chapter 4 combined, as to make lessons more problematic. Addition and subtraction are related and should not be taught in isolation. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use which will make meaning of the operations and also get opportunities to make connections and see relationships between the operations.

MATERIALS	Base-ten blocks for partners, number lines (student made)
LESSON FOCUS	**Addition and Subtraction of Multi-Digit Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded) **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON:	• How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH: Introduce students to concepts.	**Note:** After students have been exploring adding and subtracting multi-digit numbers you may find that they are relying on one strategy only. Your goal might be that each of your children has at least one or two methods that are reasonably efficient, mathematically correct, and useful with lots of different numbers. Expect different children to settle on different strategies. The problems in today's lesson lend themselves to invented strategies for addition and subtraction. Refer to chart that you have been co-constructing with students on addition and subtraction strategies. *You may say something like this, "Can you think of anything we could add to our chart that would assist you when adding and subtracting multi-digit numbers? Talk to a partner and then we will add some strategies to our chart if we come up with any" (add responses to chart).* *Today I am going to give you some similar problems as yesterday and we are going to use some strategies we charted to solve the problems. You may come up with a new strategy today when adding or subtracting*."

EXPLORE:

Note to teacher: The following problems lend themselves to some invented strategies for addition and subtraction. –*Van De Walle* page 206-208

Partners can work on the following problems. Have them solve the problems in a variety of ways. Have them estimate for reasonableness before they start. Think about how you could guide children in thinking about using some of the possible strategies provided below without telling them:

Before Solving Scaffold: You may want to brainstorm strategies as a class briefly before setting the class off to solve the problem. Their suggestions will not solve the problem for others because students must still work out the solution and explanation. –*Van De Walle, page 43*

1. **The two Scout troops went on a field trip. There were 46 Girl Scouts and 38 Boy Scouts. How many Scouts went on the trip.**

Possible responses may include:

- **Add Tens, Add Ones, Then Combine**

  40 and 30 is 70.
  6 and 8 is 14
  70 and 14 is 84 →

  40 + 30 = 70
  6 + 8 = 14
  70 + 14= 84

- **Add On Tens, Then Add Ones**

  46 and 30 more is 76.
  Then I added on the other 8. →
  76 and 4 is 80 and 4 is 84.

  46 + 30 = 76
  8 = 4 + 4
  76 + 4 = 80
  8 + 4 = 84

- **Move Some to Make Tens**

  Take 2 from the 46 and put it with the 38 to make 40. Now you have 44 and 40 more is 84. →

  46 – 2 = 44
  38 + 2 = 40
  44 + 40 = 84

- **Use a Nice Number and Compensate**

  46 and 40 is 86.
  That's 2 extra, so it's 84. →

  46 + 40 = 86
  86 - 2 = 84

2. **Sam had 46 baseball cards. He went to a card show and got some more cards for his collection. Now he has 73 cards. How many cards did Sam buy at the card show?**

Possible responses may include:

- **Add Tens to Get Close, Then Ones**

  46 and 20 is 66. (30 more is too much)
  73 – 46{ Then 4 more is 70 and 3 is 73.
  That's 20 and 7 or 27. →

  46 + **20** = 66
  66 + **4** = 70
  70 + **3** = 73
  20 + **4** + **3** = 27

- **Add Tens to Overshoot, Then Come Back**
  46 and 30 is 76.
  73 – 46{ That's 3 too much, so it's 27. →

46 + 30 = 76
76 - 3 = 73
30 - 3 = 27

- **Add Ones to Make a Ten, Then Tens and Ones**
  46 and 4 is 50.
  73 – 46{ 50 and 20 is 70 and 3 more is 73.
  The 4 and 3 is 7 and 20 is 27. →

46 + **4** = 50
50 + **20** = 70
70 + **3** = 73
4 + **3** + **20** = 27

- **Make an easier problem**

  77 – 50 = □ →

46 + 4 = 50
73 + 4 = 77
77 – 50 = 27

While conferring with students, think about what kinds of questions you could you ask to extend their thinking to move toward other strategies for addition and subtraction of multi-digit numbers. Possible guiding questions/statements to use while conferring:

- How did you approach the problem?
- Describe the strategy that you used.
- I am wondering if thinking about expanded notation might help you to solve the problem.
- Could thinking of friendly numbers help you to solve the problem?
- I wonder if you can add the tens first when solving problems?
- If you had a 3 digit number could you start adding the hundreds first?
- How do your strategies connect to one another?

Select pairs of students that will extend or advance the learning of the class during the summary. Highlight students that are using **invented addition and subtraction strategies.**

SUMMARIZE:	**Revisit the Essential Questions**: • *How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s)* • *How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract?* • *How do I use rounding or mental calulation to estimate the sum and difference between two numbers and to check the reasonableness of an answer?* • *How do I write expressions that represent situations?* • *How do I select operational symbols to make number sentences true?* Have purposefully selected students share their strategies for solving problems to the group. Add new strategies to chart. Possible guiding questions/statements: • How did you approach the problem? • What equation (number sentence) did you use to solve the problem? • Describe the strategy you used to the class? • Why does his/her strategy work? • I am wondering if thinking about expanded notation might help you to solve the problem. • How would using a friendly number help you solve the problem? • I wonder why you can add the tens first when solving problems? • If you had a 3 digit number could you start adding the hundreds first? • How do your strategies connect to one another? • How is counting up when subtracting similar/different than addition? • What have we learned about addition and subtraction?
PRACTICE/ HOMEWORK:	Practice & Problem Solving, p. 43: #11, 12; Mixed Review &Test Prep, p. 43

DAY: 18
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 3 & 4: Addition and Subtraction
LESSON 3.3 – 4.6

Note: This module has lessons constructed from chapter 3 and chapter 4 combined, as to make lessons more problematic. Addition and subtraction are related and should not be taught in isolation. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use, make meaning of the operations and also get opportunities to make connections and see relationships between the operations.

MATERIALS:	Base-ten blocks, large paper for each pair of students (11 X 17)
LESSON FOCUS:	**Addition and Subtraction of Multi-digit Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded) **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON/ESSENTIAL QUESTIONS:	• How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH:	Note: This lesson lends itself to the problem solving strategy, "predict and check". This strategy is a form of estimation and verifying the estimate; in this lesson it will just be another strategy for estimation. You may want to call the strategy "**estimate and verify**". Reflect on the chart of addition and subtraction strategies that you have been constructing with your class. You may say something like this*, "Can you think of anything we could add to our chart that would assist you when adding and subtracting multi-digit numbers? Talk to a partner and then we will add some strategies to our chart if we come up with any."(add responses to chart)* *Today I am going to give you one problem. I am wondering if we could figure out what the numbers in a problem are if we only knew the answer (the sum or difference). Sometimes mathematicians know the answer and they have to figure out what numbers to put in the problem.*
EXPLORE: Materials: base-ten blocks, large paper for each pair of students (11X17)	Put the problem on the board/chart/overhead. Students can work with a partner to solve this problem. They may use words, pictures, models, numbers to solve problems.

	Scaffold (before solving): You may want to brainstorm strategies as a class briefly before setting the class off to solve the problem. Their suggestions will not solve the problem for others because students must still work out the solution and explanation. *–Van De Walle, page 43* **The third-grade classes bought a total of 75 bags and cans of food for the animal shelter. They had 15 more cans than bags of food. How many bags and cans did the classes buy? (adapted from SE page 44)** Possible guiding questions/statements while you are conferring with students. • How did you approach the problem? • What are you suppose to find out? • How do you know what information to use? • How do you know what operation you will use when problem solving? • How is this problem different than a simple addition problem in which you are finding the sum? Explain? -You already know the sum. You have to find the unknown addends; e. g., __ + (__ + 15) = __ . • What strategy could you use to solve the problem? • How could you make more than one estimate when solving the problem? (If students are just "guessing and checking" you will want to ask them how they chose the numbers they are guessing with. You will want them to realize that pulling random numbers out of the air is not efficient and they will want to pick reasonable numbers to guess and check with.) • How did you add or subtract the numbers? Select pairs of students that will extend or advance the learning of the class during the summary. Highlight students that are using **invented addition and subtraction strategies.** **Scaffold:** TE page 44 and Alternative Teaching Strategy; TE 43 (Ask guiding questions; DO NOT TELL!) **Extension:** What if the classes bought 120 containers and had 30 more cans than bags? How many bags and how many cans did they buy (SE page 45; problem 1)
SUMMARIZE: Connect purpose to activities.	**Revisit the Essential Questions:** • *How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s)* • *How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract?* • *How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer?* • *How do I write expressions that represent situations?* • *How do I select operational symbols to make number sentences true?* Select pairs of students to share their strategies and solutions that will extend or advance the learning of the class.

	Guiding Questions: • How did you approach the problem? • How did you know what information to use to solve the problem? • What number sentence (equation) did you use to solve the problem? • How do you know what operation you will use when problem solving? • How is this problem different than a simple addition problem in which you are finding the sum? Explain? -You already know the sum. You have to find the unknown addends. e.g., __ + (__ + 15) = __ • What strategy did you use to solve the problem? • How could you make more than one estimate when solving the problem? (If students are just "guessing and checking" you will want to ask them how they chose the numbers they are guessing with. You will want them to realize that pulling random numbers out of the air is not efficient and they will want to pick reasonable numbers to guess and check with.) • How did you add or subtract the numbers? Did you find out anything new about addition or subtraction today? Explain. (chart responses on existing chart)
PRACTICE/ HOMEWORK:	SE page 45; problems 5-8

DAY: 19
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 3 & 4: Addition and Subtraction
LESSON 3.3 – 4.6

Note: This module has lessons constructed from chapter 3 and chapter 4 combined, as to make lessons more problematic. Addition and subtraction are related and should not be taught in isolation. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use, make meaning of the operations and also get opportunities to make connections and see relationships between the operations.

MATERIALS:	Base-ten blocks for pairs of students, large paper works well when students share-out (11X17)
LESSON FOCUS:	**Addition and Subtraction of Multi-digit Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded) **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON/ESSENTIAL QUESTIONS:	• How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true?
LAUNCH:	During the past few lessons you have had to come up with a number sentence to match a word problem. Today we are going to work in reverse. Sometimes mathematicians are given a number sentence and they have to come up with the context or word problem. You will be getting a variety of number sentences today and you will have to come up with word problems to match them. You will have to solve the problems, so refer to the addition/subtraction chart we have been constructing together. As always, you will want to make an estimate first before you solve. Don't forget to be thinking about the way you are adding or subtracting numbers and how both operations relate. **Note**: Do not tell students how to do this. It is okay if they struggle. You are there to guide them NOT tell them.
EXPLORE: Materials: base-ten blocks, counters, large paper for each pair of students (11 X17)	Have students choose 3 or 4 problems to make word problems (or put into context). Have students work in partners. They may use words, pictures, models, and/or numbers to solve problems. Choose some problems from chapters 3 and 4 that only use numerical representation "naked numbers". (e. g., $3.73 - $2.08 = ___)

	Note: Please choose problems that use manageable quantities for your students. Furthermore, **make sure** you choose **addition and subtraction** problems so children can look for relationships between the operations. Suggested problems (choose 3 or 4 only): SE Page 50, Problems 12-18; these problems are addition SE Page 70, Problems 10-23; these problems are subtraction • Make sure you choose problems that are organized vertically as well as horizontally. Guiding Questions while you are conferring with students: • How do your words match your equation/representation? • What words in your problem suggests what operation you are using (subtraction/addition)? • How did you approach the problem? • How did you add or subtract numbers? • How would counting up help you to solve some of the problems? • How would breaking numbers apart help you to solve the problems? Select pairs of students that will extend or advance the learning of the class during the summary. Highlight students that are using **invented addition and subtraction strategies.**
SUMMARIZE:	**Revisit the Essential Questions:** • *How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s)* • *How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract?* • *How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer?* • *How do I write expressions that represent situations?* • *How do I select operational symbols to make number sentences true?* Select pairs of students that will extend or advance the learning of the class during the summary. Highlight students that are using **invented addition and subtraction strategies.** Guiding questions: • How do your words match your equation/representation? • What equation did you use to solve the problem? Did anyone use a different equation? • What words in your problem suggests what operation you are using (subtraction/addition)? • How did you approach the problem? • How did you add or subtract numbers? • How would counting up help you to solve some of the problems? • How would breaking numbers apart help you to solve the problems? • What have you learned about addition or subtraction that you would like to add to our chart?
PRACTICE/ HOMEWORK:	SE page 50; problems 15-20

DAY: 20
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 3 & 4: Addition and Subtraction
LESSON 3.3 – 4.6

Note: This module has lessons constructed from chapter 3 and chapter 4 combined, as to make lessons more problematic. Addition and subtraction are related and should not be taught in isolation. Furthermore, addition and subtraction have been taught in previous grades. By combining addition and subtraction problems in each lesson, students will have to make decisions about what operations to use, make meaning of the operations and also get opportunities to make connections and see relationships between the operations.

MATERIALS:	Number lines from 1-1,000 with increments of 100 – use strips of 6" X 18" paper for students to draw number lines
LESSON FOCUS:	**Addition and Subtraction of Multi-digit Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded) **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON/ESSENTIAL QUESTIONS:	• How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer? • How do I write expressions that represent situations? • How do I select operational symbols to make number sentences true
LAUNCH:	**Note:** This lesson is exactly like the prior lesson. You may have students pick some new problems to solve from the suggested list if you feel they need more practice. In the prior lesson we took addition and subtraction equations and constructed a word problem (added context) to match them. • What challenges did you have? • Did you learn anything from the prior lesson that would assist you today? Explain. You will be getting 3 or 4 equations today and you will have to come up with word problems to match them. You will have to solve the problems, so refer to the addition/subtraction chart we have been constructing together. As always, you will want to make an estimate first before you solve. Don't forget to be thinking about the way you are adding or subtracting numbers and how both operations relate.

	Note: Do not tell students how to do this. It is okay if they struggle. You are there to guide them NOT tell them.
EXPLORE:	Have students choose 3 or 4 problems to make word problems (or put into context). Have students work in partners. They may use words, pictures, models, and/or numbers to solve problems. Choose some problems from chapters 3 and 4 that only use numerical representation "naked numbers". (e.g., $3.73 - $2.08 = ___) Note: Please choose problems that use manageable quantities for your students. Furthermore, **make sure** you choose **addition and subtraction** problems so children can look for relationships between the operations. Suggested problems (choose 3 or 4 only, different from the prior lesson): SE Page 50, Problems 12-18; these problems are addition SE Page 70, Problems 10-23; these problems are subtraction • Make sure you choose problems that are organized vertically as well as horizontally. Guiding Questions while you are conferring with students: • How do your words match your equation/representation? • What words in your problem suggests what operation you are using (subtraction/addition)? • How did you approach the problem? • How did you add or subtract numbers? • How would counting up help you to solve some of the problems? • How would breaking numbers apart help you to solve the problems? • How would using friendly numbers help in adding or subtracting? Select pairs of students that will extend or advance the learning of the class during the summary. Highlight students that are using **invented addition and subtraction strategies.**

SUMMARIZE:	Revisit the Essential Questions: • **How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s)* • *How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract?* • *How do I estimate the sum and difference between two numbers and to check the reasonableness of an answer?* • *How do I write expressions that represent situations?* • *How do I select operational symbols to make number sentences true?* Select pairs of students to share their thinking. Highlight students that are using invented addition and subtraction strategies. Guiding Questions: • *How do your words match your equation/representation?* • *What words in your problem suggests what operation you are using (subtraction/addition)?* • *How did you approach the problem?* • *How did you add or subtract the numbers?* • *How would counting up help you to solve some of the problems?* • *How would breaking numbers apart help you to solve the problems?* • *How would using friendly numbers help in adding or subtracting?* • *Have we learned anything new about addition and subtraction that we could add to our chart?*
PRACTICE/ HOMEWORK:	SE page 67, problems 9 & 10

DAY: 21
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 4; Subtraction
Lesson 4.4 (pp. 62-65)

MATERIALS:	Transparency of 100's chart (TR15), base-ten blocks
LESSON FOCUS:	**Subtract Greater Numbers (subtraction across zeros)**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.1**: Represent relationships of quantities in the form of mathematical expressions, equations, or inequalities. **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded) **2.1:** Use estimation to verify the reasonableness of calculated results.
PURPOSE OF LESSON:	• How can I use the strategies of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • *How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How do I select operational symbols to make number sentences true?
LAUNCH: Transparency of 100's chart (TR 15)	**Play a round of "How Far, How Do You Know?"** • Display the 100's chart on the overhead. • Give students a number between 1 and 100 (e.g., 42) and ask them how far it is from that number to 100. • After students have determined the difference, ask students to share with a partner their strategy for getting to 100. (For example: "It is 58 away from 100. I thought it was 8 from 42 to 50 then 50 more to 100. 8 + 50 = 58.") If students are having difficulty finding the difference mentally, ask: "How far away is that number from the next 10?" While students are sharing their strategies, walk among the groups, listening for strategies in which they used 10's and other benchmark number to get to 100. The idea you want to strengthen is: To find the difference between two numbers, it is advantageous to use an "add up" strategy that utilizes benchmark numbers. • Ask 1 or 2 of those students to share their strategies with the class as you record them for the class to see. • Repeat with other numbers and facilitate a class conversation around the strategies. Add strategies to chart as necessary. • (You may want to try a few numbers so that students can become comfortable with this strategy.)

EXPLORE:	**Task: "Solve problems a – g using whatever efficient strategy makes sense to you. Briefly describe your strategy to your partner and write down how it works." Refer to the chart you have been constructing with your students.** a. 1,000 – 975 b. 8,000 – 2,001 c. 8,000 – 6,000 d. 3,000 – 2,999 e. 1,402 – 602 f. 5,000 – 4,007 g. 2,400 – 2,385 These subtraction problems can be solved in different ways. Some problems can be solved by counting up to benchmark numbers, breaking apart into expanded form, or other strategies. This **Explore** will help students develop a repertoire of flexible strategies they can use when subtracting. Your role is to make sure that students develop number sense and operational sense as they explain their strategy. • Group students as partners so that they can share their thinking with each other. The purpose of this **Explore** is to help students differentiate between strategies that work efficiently for different problems. • Before students begin to solve each problem, ask them to stop and think about *how* they will approach the problem. • Pay close attention to *how* students group and solve the problems. This will tell you about their understanding of place value and what subtraction is, as well as how comfortable students may be with particular strategies. **Note:** As was stated in the directions, don't tell students which strategies they should use. This experience is for them to make sense of a strategy that works for them. As students exchange strategies with their partners, they may begin to make sense of new strategies that are more efficient to them. Possible guiding questions while conferring with students: • *How did you decide to solve the problems?* • *Did you use a variety of strategies to solve the problems? Explain?* • *Why did you decide to use that particular strategy?* • *How are the strategies similar/different from one another?*

SUMMARIZE: Connect purpose to activities.	**Revisit the Essential Question:** • *How can I use the strategies of "breaking apart", making combinations of ten, and using numbers in expanded form to add and subtract?* • *How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s* • *How do I select operational symbols to make number sentences true?* • Choose one of the problems that you saw students solve with different strategies. • Ask for volunteers to explain what strategy worked for them and record the steps for it on a chart. Add any new strategies to charts you have been co-constructing with students. • Call for several different strategies to be shared. • The conversation should focus on the meanings of subtraction and the understanding of place value within the numbers used. **Guiding Questions:** • *How did you decide to solve the problem?* • *Compare the strategies charted. How are they different? How are they the same?* • *Why did you decide to use that particular strategy?* • *Which of your partner's strategies did not make sense to you?*
HOMEWORK:	Try out one of the strategies you learned today on problems 2-6; SE page 63

DAY: 22
Unit 1: UNDERSTAND NUMBERS AND OPERATIONS
Chapter 3 & 4: Addition & Subtraction
LESSON 3.3 – 4.6

MATERIALS:	Digit cards (included in module), score sheet (included at end of module)
LESSON FOCUS:	**Addition and Subtraction of Multi-digit Numbers**
CALIFORNIA STANDARDS:	**Number Sense:** **2.1**: Find the sum or difference of two whole numbers between 0 and 10,000. **Algebra and Functions: 1.0, 1.2** **1.3**: Select appropriate operational and relational symbols to make an expression true. **Mathematical Reasoning:** (standards are embedded)
PURPOSE OF LESSON:	• How can I use the strategy of "breaking apart", making combinations of ten and using numbers in expanded form to add and subtract? • How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically? *presented in previous grade(s) • How do I select operational symbols to make number sentences true?
LAUNCH: Introduce students to concepts.	**Introduce the game "Approaching 1,000"** Today, the students will learn to play a game that will involve mentally comparing numbers, adding large numbers and subtracting across zeros. This game's objective is to find two three-digit numbers that will add up to a number close to "1,000". • Read and explain the instructions to the students. **Instructions for the game:** 1. For the first draw, deal out eight digit cards to each team of partners. 2. Each team uses six of these cards to make two numbers that, when added, come up as close as possible to a total of 1,000. 3. The team records these two numbers and the total on the score sheet. The team's score for each draw is the difference between the sum of the two numbers and 1,000. Those six cards are then put into a discard pile and it is the other team's turn to do the same. 4. For each successive draw, six new cards are dealt to each team so that each team again has eight cards from which to choose. The game ends after five draws. If the deck runs out of cards before the game is over, shuffle the discard pile and continue to deal. At the end of five draws, the teams total their scores. The lowest total score wins.
EXPLORE: Materials: 0-9 digit cards, "Approaching 1,000" score sheets (included)	Sample Game →

Approaching 1,000

Team Michele and Alma

First Draw	359 + 605 = 964	36
Second Draw	823 + 169 = 992	8
Third Draw	574 + 430 = 1004	4
Fourth Draw	478 + 609 = 1087	87
Fifth Draw	279 + 800 = 1079	79
	Game Score	214

	Play "Approaching 1,000" • Group students in teams of two. Teams will play each other during the game. • Hand out the 0 – 9 Digit cards and the "Approaching 1,000" score sheet. Each team will need one score sheet, but can share the digit cards. • Students may record on a piece of paper how they are figuring out the differences, or may work mentally. **Note:** While the game is in progress, circulate around the class and see if students can: • Add or estimate <u>mentally</u> (or do they use paper/pencil to calculate). • Use a strategy for forming the addends (or do they try combinations almost randomly). • Consider the sum of the "hundreds" digit first when picking the two numbers. **Scaffold:** • If necessary, you may change the game to "Approaching 100". For this game, students draw six cards and use four to make two numbers that add to a number close to 100. Possible questions while conferring with students: • *What was your strategy for arranging the numbers you wanted to add?* • *What friendly numbers were you looking for? How did this help you?* • *What method did you use to add the numbers? Was it mental math? Did you have to write it down? Did you add numbers left to right or by regrouping?* • *What method did you use to subtract the numbers?*
SUMMARIZE:	**Revisit the Essential Questions:** • How can I use the strategy of "breaking apart," making combinations of ten and using numbers in expanded form to add and subtract? • How do I use concrete materials to solve addition and subtraction problems requiring regrouping and represent the solutions symbolically *presented in previous grade(s)? • How do I select operational symbols to make number sentences true? For the discussion, call the students together to talk about the strategies the students used and the methods that students used to solve their addition and subtraction problems. This game involves a lot of calculation, so push students to think about the values of the numbers and how the methods they used are built upon their understanding of place value. **Guiding questions:** • What was your strategy for arranging the numbers you wanted to add? • What friendly numbers were you looking for? How did this help you? • What method did you use to add the numbers? Was it mental math? Did you have to write it down? Did you add numbers left to right or by grouping? • What method did you use to subtract the numbers? • What have you learned about addition and subtraction? (add to chart)

Approaching 1,000

Team _____ and _____

		Distance from 1,000
First Draw	__ __ __ + __ __ __ = _____	_____
Second Draw	__ __ __ + __ __ __ = _____	_____
Third Draw	__ __ __ + __ __ __ = _____	_____
Fourth Draw	__ __ __ + __ __ __ = _____	_____
Fifth Draw	__ __ __ + __ __ __ = _____	_____

GAME SCORE _____

cut here

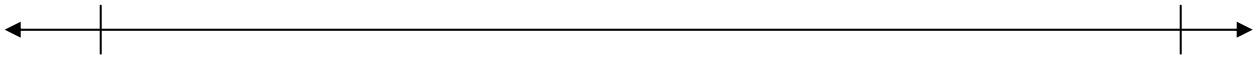
Approaching 1,000

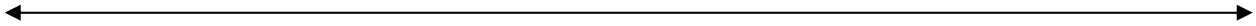
Team _____ and _____

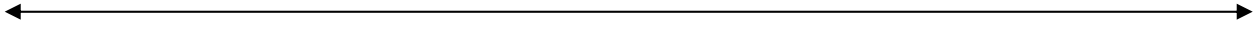
		Distance from 1,000
First Draw	__ __ __ + __ __ __ = _____	_____
Second Draw	__ __ __ + __ __ __ = _____	_____
Third Draw	__ __ __ + __ __ __ = _____	_____
Fourth Draw	__ __ __ + __ __ __ = _____	_____
Fifth Draw	__ __ __ + __ __ __ = _____	_____

GAME SCORE

NUMBER LINES







How Many Small Squares?