Foundations

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Lesson 1

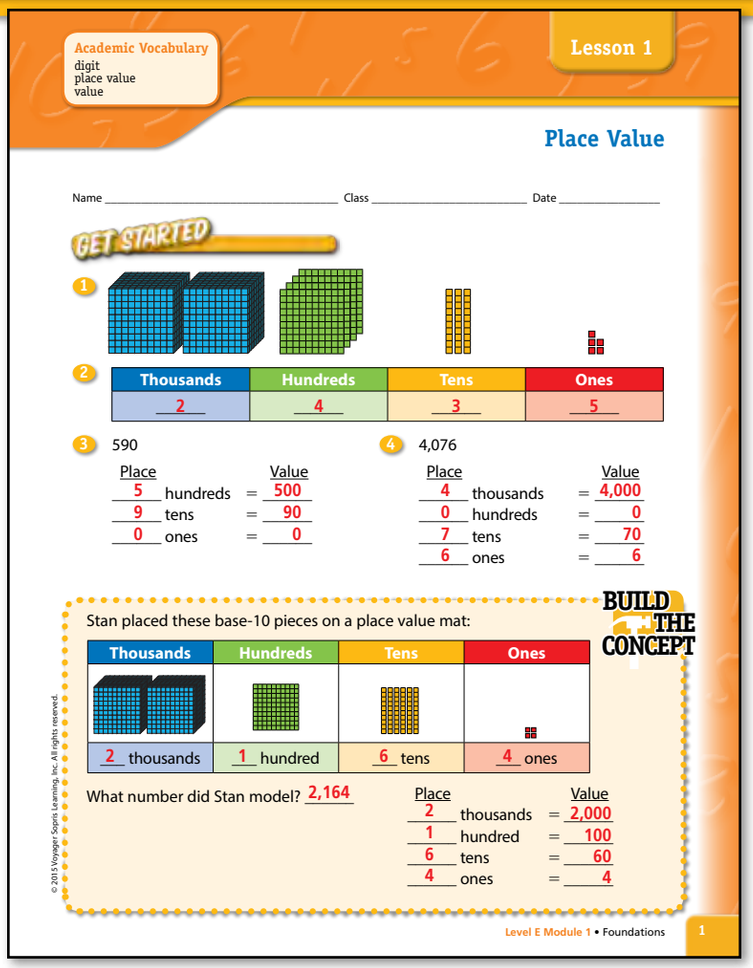
Objective

To identify place value through the thousands place

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **digit**
  any one of these 10 numerals: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9
- **place value**
  location of a digit in a number; helps determine the value of a digit
- **value**
  an amount given to a digit based on the digit and the digit's place value


Academic Vocabulary
digit
place value
value

Lesson 1

Place Value

Name _____ Class _____ Date _____

GET STARTED

1

2

Thousands	Hundreds	Tens	Ones
2	4	3	5

3 590

Place		Value
5	hundreds =	500
9	tens =	90
0	ones =	0

4 4,076

Place		Value
4	thousands =	4,000
0	hundreds =	0
7	tens =	70
6	ones =	6

BUILD THE CONCEPT

Stan placed these base-10 pieces on a place value mat:

Thousands	Hundreds	Tens	Ones
2 thousands	1 hundred	6 tens	4 ones

What number did Stan model? 2,164

Place		Value
2	thousands =	2,000
1	hundred =	100
6	tens =	60
4	ones =	4

Level E Module 1 • Foundations 1

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

These base-10 pieces represent numbers. Look at the small ones blocks on the right. Each ones block represents one unit.

Look at the rectangular blocks, or strips. Each rectangular strip contains 10 small blocks. Each rectangular strip is called a tens rod. One tens rod represents 1 ten.

To the left of the rods are hundreds flats. Each flat contains 100 small blocks. So, each hundreds flat represents 1 hundred.

To the left of the hundreds flats are thousands cubes. Each thousands cube contains 1,000 small blocks.

MODEL NEW SKILLS

Problem 2

This is a place value chart. It represents ones, tens, hundreds, and thousands. Look at the ones blocks above the ones place on the chart. Each ones block is one unit. How many ones are represented? (5) **Write 5 under the word *Ones* in the chart.**

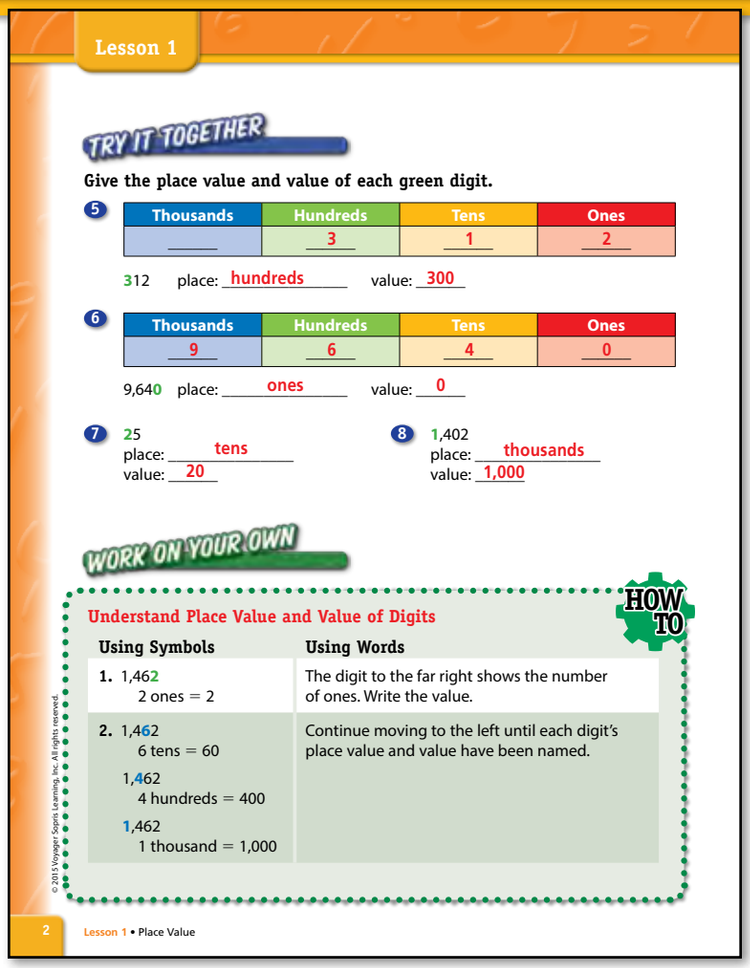
Look at the tens rods. Each rod represents 1 ten because each rod contains 10 small blocks. There are 3 tens rods. Each tens rod is 1 ten, so how many tens are shown? (3) **Write 3 under the word *Tens* in the chart.**

Look at the hundreds flats. Each hundreds flat represents 1 hundred. Why does each hundreds flat represent 1 hundred? (Each flat contains 100 small blocks.) **How many hundreds flats are shown?** (4) **How many hundreds are shown?** (4) **Write 4 under the word *Hundreds* in the chart.**

The thousands cubes contain 1,000 small blocks. Each thousands cube represents 1 thousand. How many thousands cubes are shown? (2) **How many thousands are shown?** (2) **Write 2 under the word *Thousands* in the chart.**

Problem 3

Look at the digit 0 in the number 590. This digit is in the ones place. It shows that 0 ones are in the ones place. Write 0 on the line to the left of the word *ones*. The value of 0 ones is 0. Write 0 on the line to the right of the word *ones*.



Lesson 1

TRY IT TOGETHER

Give the place value and value of each green digit.

5

Thousands	Hundreds	Tens	Ones
	3	1	2

312 place: hundreds value: 300

6

Thousands	Hundreds	Tens	Ones
9	6	4	0

9,640 place: ones value: 0

7 25
place: tens
value: 20

8 1,402
place: thousands
value: 1,000

WORK ON YOUR OWN

HOW TO

Understand Place Value and Value of Digits

Using Symbols	Using Words
1. 1,462 2 ones = 2	The digit to the far right shows the number of ones. Write the value.
2. 1,462 6 tens = 60 1,462 4 hundreds = 400 1,462 1 thousand = 1,000	Continue moving to the left until each digit's place value and value have been named.

2 Lesson 1 • Place Value

Look at the digit 9 in the number 590. The 9 is in the tens place. How many tens are in the number 590? (9) **Write 9 on the line to the left of the word *tens*. The value of 9 tens is 90. Write 90 on the line to the right of the word *tens*.**

Look at the digit 5 in the number 590. This digit is in the hundreds place. How many hundreds are in the number 590? (5) **Write 5 on the line to the left of the word *hundreds*. The value of 5 hundreds is 500. Write 500 on the line to the right of the word *hundreds*.**

Problem 4

What digit is at the far right in the number 4,076? (6) **This digit shows how many ones are in the number 4,076. Write 6 on the line to the left of the word *ones*. What is the value of 6 ones?** (6) **Write 6 on the line to the right of the word *ones*.**

Which digit is to the left of 6 in 4,076? (7) **The 7 shows that there are 7 tens in 4,076. Write 7 on the line to the left of the word *tens*. What is the value of 7 tens?** (70) **Write 70 on the line to the right of the word *tens*.**

Look at the 0 in 4,076. What place is the 0 in? (hundreds place) **Write 0 on the line to the left of the word *hundreds*. What is the value of 0 hundreds?** (0) **Write 0 on the line to the right of the word *hundreds*.**

Look at the digit 4. What place value is the 4 in? (thousands) **Write 4 on the line to the left of the word *thousands*. What is the value of 4 thousands?** (4,000) **Write 4,000 on the line to the right of the word *thousands*.**

BUILD THE CONCEPT

Model how to determine the place and value of digits in a number using base-10 pieces.

Base-10 pieces can be used to determine the place and value of digits in a number. Look at the pieces Stan placed on the place value mat. How many thousands cubes are there? (2) **Write 2 in the thousands place. How many hundreds flats are there?** (1) **Write 1 in the hundreds place. How many tens rods are there?** (6) **Write 6 in the tens place. How many ones blocks are there?** (4) **Write 4 in the ones place.**

What number did Stan model? (2,164) **There are 4 ones, so what is the value of the 4?** (4) **There are 6 tens, so what is the value of the 6?** (60) **There is 1 hundred, so what is the value of the 1?** (100) **There are 2 thousands, so what is the value of the 2?** (2,000)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

Look at the number 312. Which digit is in the ones place? (2) **Write 2 in the chart in the ones column. Which digit is in the tens place?** (1) **Write 1 in the chart in the tens column. Which digit is in the hundreds place?** (3) **Write 3 in the chart in the hundreds column. There are no thousands in this number.**

What is the value of 2 ones? (2) **What is the value of 1 ten?** (10) **What is the value of 3 hundreds?** (300) **What is the place value of the green digit?** (hundreds) **What is its value?** (300)

Problem 6

Look at the number 9,640. Which digit is in the ones place? (0) **Where should 0 be written?** (in the ones column) **Which digit is in the tens place?** (4) **Where should 4 be written?** (in the tens column) **Which digit is in the hundreds place?** (6) **Where should the 6 be written?** (in the hundreds column) **Which digit**

is in the thousands place? (9) **Where should the 9 be written?** (in the thousands column) **What is the place value of the green digit?** (ones) **What is its value?** (0)

Problem 7

Which digit is green? (2) **What is the place value of 2 in 25?** (tens) **What is its value?** (20)

Problem 8

Which digit is green? (1) **What is the place value of 1 in 1,402?** (thousands) **What is its value?** (1,000)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING This problem illustrates the **Using a Chart** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem by using a chart. The instruction is immediately followed by application of the strategy in problem 24.

Have students read the problem.

Tell students that a chart can be used to help solve a problem. A chart can also be used to help organize the information given in a problem.

Four numbers are given in the problem:

2 in the hundreds place

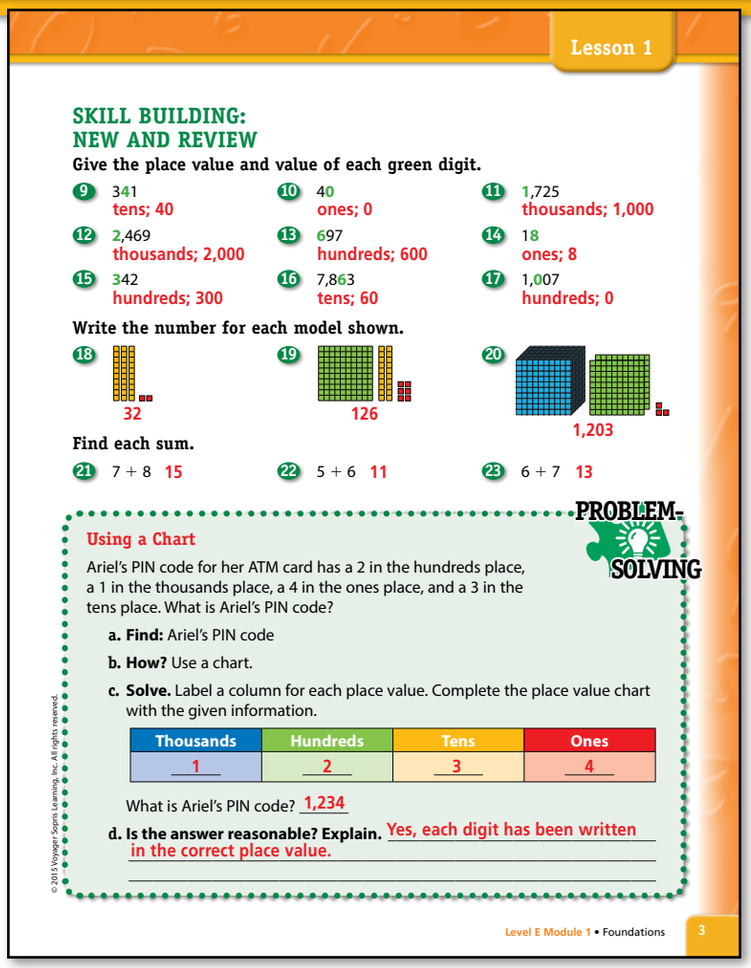
1 in the thousands place

4 in the ones place

3 in the tens place

Be sure that students realize that the numbers are not given in the correct positional order. Students may be tempted to use 2,143 as an answer.

Have students use the place value chart to find the correct answer. Write each number in the chart as it is listed in the problem.



Lesson 1

SKILL BUILDING: NEW AND REVIEW

Give the place value and value of each green digit.

9. 341 — tens; 40
10. 40 — ones; 0
11. 1,725 — thousands; 1,000
12. 2,469 — thousands; 2,000
13. 697 — hundreds; 600
14. 18 — ones; 8
15. 342 — hundreds; 300
16. 7,863 — tens; 60
17. 1,007 — hundreds; 0

Write the number for each model shown.

18. 32
19. 126
20. 1,203

Find each sum.

21. 7 + 8 = 15
22. 5 + 6 = 11
23. 6 + 7 = 13

PROBLEM-SOLVING

Using a Chart

Ariel's PIN code for her ATM card has a 2 in the hundreds place, a 1 in the thousands place, a 4 in the ones place, and a 3 in the tens place. What is Ariel's PIN code?

a. Find: Ariel's PIN code

b. How? Use a chart.

c. Solve. Label a column for each place value. Complete the place value chart with the given information.

Thousands	Hundreds	Tens	Ones
1	2	3	4

What is Ariel's PIN code? 1,234

d. Is the answer reasonable? Explain. Yes, each digit has been written in the correct place value.

Problems 9–27

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problem 24 **Reminder**

Encourage students to create a place value chart to help them write each digit in its correct place value.

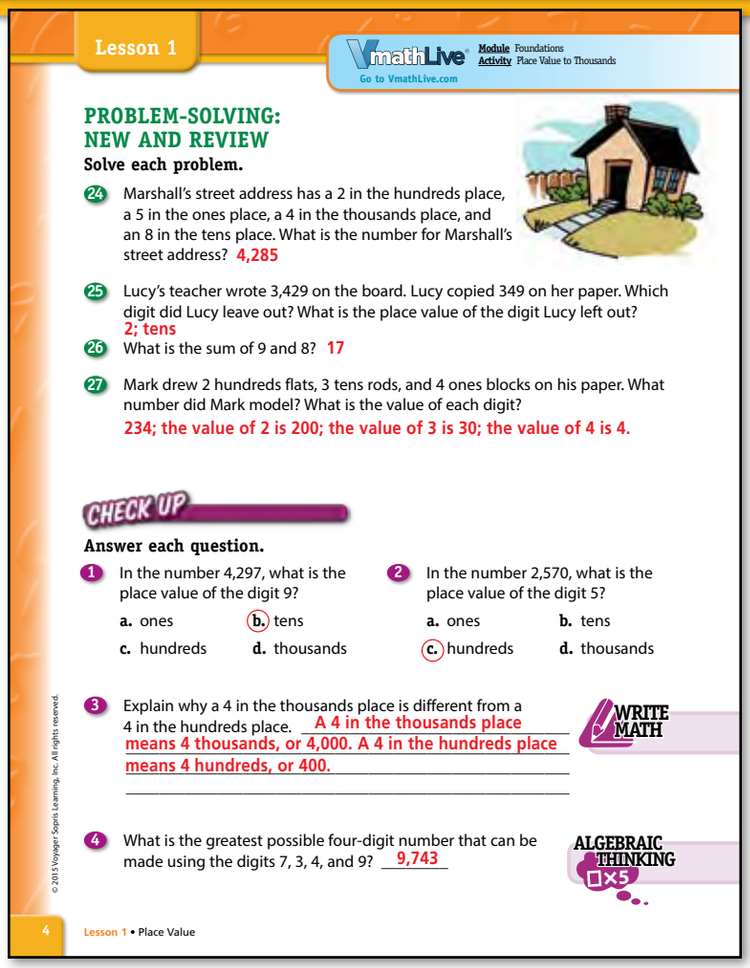
CHECK UP

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered problems 1 or 2 incorrectly: The student made a mistake in determining the place value for the given digit. Encourage the student to use a place value chart to determine place value. Use Additional Resources in E.1.1 to review place value.



Lesson 1

VmathLive Module Foundations Activity Place Value to Thousands Go to VmathLive.com

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

24 Marshall's street address has a 2 in the hundreds place, a 5 in the ones place, a 4 in the thousands place, and an 8 in the tens place. What is the number for Marshall's street address? 4,285

25 Lucy's teacher wrote 3,429 on the board. Lucy copied 349 on her paper. Which digit did Lucy leave out? What is the place value of the digit Lucy left out?
2; tens

26 What is the sum of 9 and 8? 17

27 Mark drew 2 hundreds flats, 3 tens rods, and 4 ones blocks on his paper. What number did Mark model? What is the value of each digit?
234; the value of 2 is 200; the value of 3 is 30; the value of 4 is 4.

CHECK UP

Answer each question.

1 In the number 4,297, what is the place value of the digit 9?
a. ones **b.** tens
c. hundreds **d.** thousands

2 In the number 2,570, what is the place value of the digit 5?
a. ones **b.** tens
c. hundreds **d.** thousands

3 Explain why a 4 in the thousands place is different from a 4 in the hundreds place. A 4 in the thousands place means 4 thousands, or 4,000. A 4 in the hundreds place means 4 hundreds, or 400.

WRITE MATH

4 What is the greatest possible four-digit number that can be made using the digits 7, 3, 4, and 9? 9,743

ALGEBRAIC THINKING □×5

4 Lesson 1 • Place Value

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review place value through thousands with the student. Remind the student that digits in different places have different values.

Technology

Have students practice math fluency while competing against one another online in VmathLive activities. Online videos in VmathLive reinforce math concepts. Additional digital content is available through this feature in the eBook.

DIFFERENTIATION

Additional Resources

VmathLive

VmathLive
Module: Foundations
Activity: Place Value to Thousands

Vmath Reteach
Reteach Student Book Module 1 Lesson 1
Reteach Teacher Edition Module 1 Lesson 1

Extra Practice
Student Book page 35

English Language Learners

Display a thousands cube, a hundreds flat, a tens rod, and a ones block. Hold up the thousands cube. Explain that it is called a thousands cube because it has the shape of a cube. It represents 1,000. Hold up a hundreds flat. Tell them that it is called a hundreds flat and it is a flat surface. It represents 100. Hold up a tens rod. Tell them that it is called a tens rod and it has the shape of 10 ones linked together to form a rod. It represents 10. Hold up a ones block. Tell them that it is called a ones block and it has the shape of a block. It represents 1.

Students with Special Needs

Use money to help students understand place value. Use a place value chart with columns for dollars, dimes, and pennies. Write digits in the chart and ask students to talk about the value. Repeat several times. Discuss how the value of a digit changes as it is moved from column to column.

Lesson 2

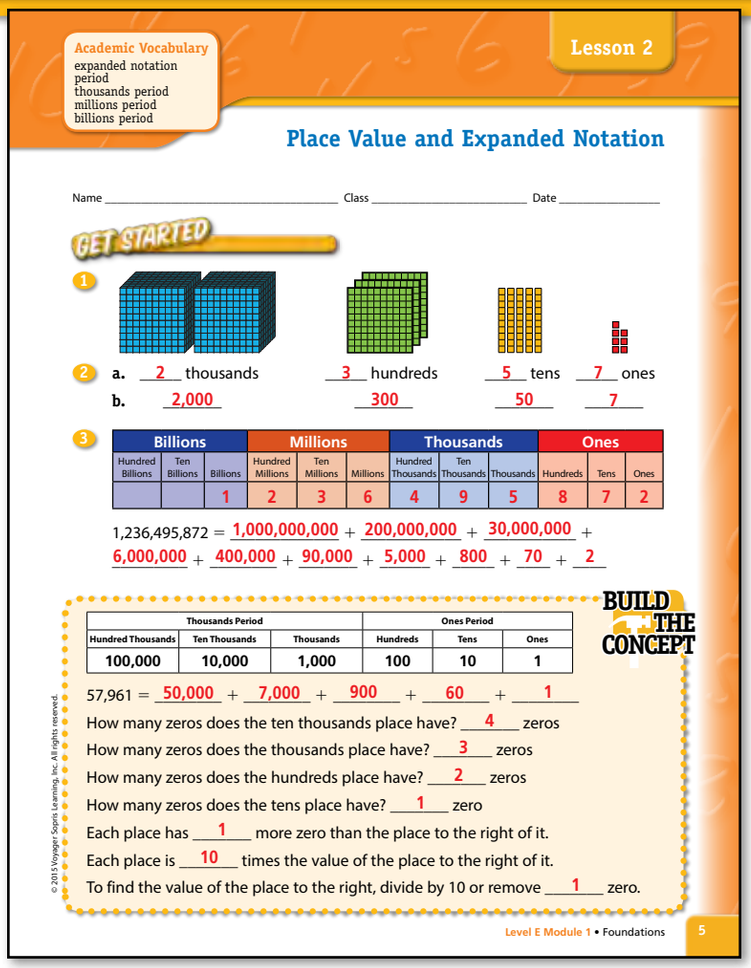
Objective

To write a whole number using expanded notation

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **expanded notation**
  a form of notation in which a number is written as the sum of the values of its digits
- **period**
  each group of three digits separated by a comma in a multi-digit number
- **thousands period**
  the period to the left of the ones period, containing the thousands place, the ten thousands place, and the hundred thousands place
- **millions period**
  the period to the left of the thousands period, containing the millions place, the ten millions place, and the hundred millions place
- **billions period**
  the period to the left of the millions period, containing the billions place, the ten billions place, and the hundred billions place



Academic Vocabulary
expanded notation
period
thousands period
millions period
billions period

Lesson 2

Place Value and Expanded Notation

Name _____ Class _____ Date _____

GET STARTED

1

2 a. 2 thousands 3 hundreds 5 tens 7 ones

b. 2,000 300 50 7

3

Billions			Millions			Thousands			Ones		
Hundred Billions	Ten Billions	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		1	2	3	6	4	9	5	8	7	2

1,236,495,872 = 1,000,000,000 + 200,000,000 + 30,000,000 + 6,000,000 + 400,000 + 90,000 + 5,000 + 800 + 70 + 2

BUILD THE CONCEPT

Thousands Period			Ones Period		
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
100,000	10,000	1,000	100	10	1

57,961 = 50,000 + 7,000 + 900 + 60 + 1

How many zeros does the ten thousands place have? 4 zeros

How many zeros does the thousands place have? 3 zeros

How many zeros does the hundreds place have? 2 zeros

How many zeros does the tens place have? 1 zero

Each place has 1 more zero than the place to the right of it.

Each place is 10 times the value of the place to the right of it.

To find the value of the place to the right, divide by 10 or remove 1 zero.

Level E Module 1 • Foundations 5

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

The model represents a number. Each large cube is 10 blocks long, 10 blocks wide, and 10 blocks tall, which represents 1 thousand. These are called thousands cubes. Each large square has 10 rows and 10 columns, which represents 1 hundred. These are called hundreds flats. Each rectangular strip represents 1 ten and is called a tens rod. Each small square represents 1 unit and is called a ones block.

MODEL NEW SKILLS

Problem 2

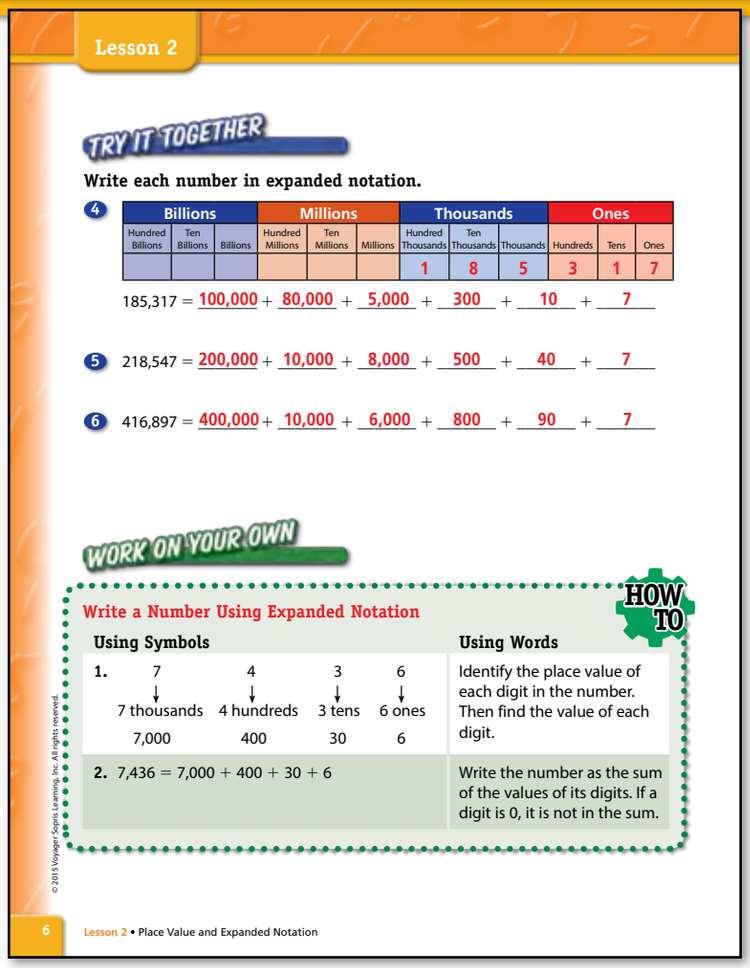
How many thousands cubes are shown in problem 1? (2) **How many hundreds flats are shown?** (3) **How many tens rods are shown?** (5) **How many ones blocks are shown?** (7)

What is the value of 2 thousands? (2,000) **Write 2,000 on the first line in problem 2b. What is the value of 3 hundreds?** (300) **Write 300 on the second line in problem 2b. What is the value of 5 tens?** (50) **Write 50 on the third line. What is the value of 7 ones?** (7) **Write 7 on the last line.**

Problem 3

Each three place values in a number beginning at the right form a place value period. The first period is called the ones period. The chart shows place value through the billions period. The top row of the chart lists the names of the periods. The second row tells the place value of each digit in a number. The chart can be used to write a number as the sum of the values of its digits. This form of the number is called expanded notation. The sum of the numbers in expanded notation equals the original number.

How many digits are in the number 1,236,495,872? (10) **The leftmost digit is in the billions place. What is the leftmost digit?** (1) **Write 1 in the first row in the chart under Billions. What is the value of the 1?** (1,000,000,000)



Lesson 2

TRY IT TOGETHER

Write each number in expanded notation.

4

Billions			Millions			Thousands			Ones		
Hundred Billions	Ten Billions	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
						1	8	5	3	1	7

185,317 = 100,000 + 80,000 + 5,000 + 300 + 10 + 7

5 218,547 = 200,000 + 10,000 + 8,000 + 500 + 40 + 7

6 416,897 = 400,000 + 10,000 + 6,000 + 800 + 90 + 7

WORK ON YOUR OWN

HOW TO

Write a Number Using Expanded Notation

Using Symbols	Using Words
1. 7 (7 thousands, 7,000) 4 (4 hundreds, 400) 3 (3 tens, 30) 6 (6 ones, 6)	Identify the place value of each digit in the number. Then find the value of each digit.
2. 7,436 = 7,000 + 400 + 30 + 6	Write the number as the sum of the values of its digits. If a digit is 0, it is not in the sum.

What is the next digit? (2) **Write 2 in the second row in the chart under Hundred Millions. What is the value of the 2?** (200,000,000) **Where should the digit 3 be written in the chart?** (under Ten Millions) **What is the value of the 3?** (30,000,000) **Where should the digit 6 be written in the chart?** (under Millions) **What is the value of the 6?** (6,000,000)

Where should the digit 4 be written in the chart? (under Hundred Thousands) **What is the value of the 4?** (400,000) **Where should the digit 9 be written in the chart?** (under Ten Thousands) **What is the value of the 9?** (90,000) **Where should the digit 5 be written in the chart?** (under Thousands) **What is the value of the 5?** (5,000)

Where should the digit 8 be written in the chart? (under Hundreds) **What is the value of the 8?** (800) **Where should the digit 7 be written in the chart?** (under Tens) **What is the value of the 7?** (70) **Finally, write 2 under Ones.**

The expanded notation for 1,236,495,872 is the sum of the values of its digits, as shown in the chart. So, 1,236,495,872 can be written as 1,000,000,000 plus 200,000,000 plus 30,000,000 plus 6,000,000 plus 400,000 plus 90,000 plus 5,000 plus 800 plus 70 plus 2.

BUILD THE CONCEPT

Model how to write a whole number in expanded notation.

Look at the number 57,961. To write the number in expanded notation, write the values of the digits. How many digits are in the number 57,961? (5) **In what place is the 5?** (ten thousands place) **What is the value of the 5?** (50,000)

What is the value of the 7? (7,000) **What is the value of the 9?** (900) **What is the value of the 6?** (60) **What is the value of the 1?** (1)

How many zeros does the ten thousands place have? (4) **How many zeros does the thousands place have?** (3) **How many zeros does the hundreds place have?** (2) **How many zeros does the tens place have?** (1)

How many more zeros does the ten thousands place have than the thousands place? (1) **How many more zeros does the thousands place have than the hundreds place?** (1) **How many more zeros does the hundreds place have than the tens place?** (1)

Each place has how many more zeros than the place to the right of it? (one more) **Writing another zero at the right side of a number is the same as multiplying by what number?** (10) **So each place is how many times the value of the place to the right of it?** (10)

To find the value of a place to the right, divide by 10 or remove how many zeros from the number? (1 zero)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 4

To write the number 185,317 in expanded notation, first write the number in the place value chart.

What digit is in the hundred thousands place? (1) **What is the value of the 1?** (100,000) **What digit is in the ten thousands place?** (8) **What is the value of the 8?** (80,000) **What digit is in the thousands place?** (5) **What is the value of the 5?** (5,000) **What digit is in the hundreds place?** (3) **What is the value of the 3?** (300) **What digit is in the tens place?** (1) **What is the value of the 1?** (10) **What digit is in the ones place?** (7) **What is its value?** (7)

How is the number 185,317 written in expanded notation? (100,000 + 80,000 + 5,000 + 300 + 10 + 7)

Problem 5

To write the expanded notation for a number without a place value chart, always work from left to right. In what place is the digit 2 in the number 218,547? (hundred thousands) **What is the value of the 2?** (200,000) **What is the value of the 1?** (10,000) **What is the value of the 8?** (8,000) **What is the value of each of the digits in the ones period?** (500, 40, and 7)

How is the number 218,547 written in expanded notation? (200,000 + 10,000 + 8,000 + 500 + 40 + 7)

Problem 6

How is the number 416,897 written in expanded notation? (400,000 + 10,000 + 6,000 + 800 + 90 + 7)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING This problem illustrates the **Using a Table** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem by using a table. The instruction is immediately followed by application of the strategy in problem 14.

Have students read the problem.

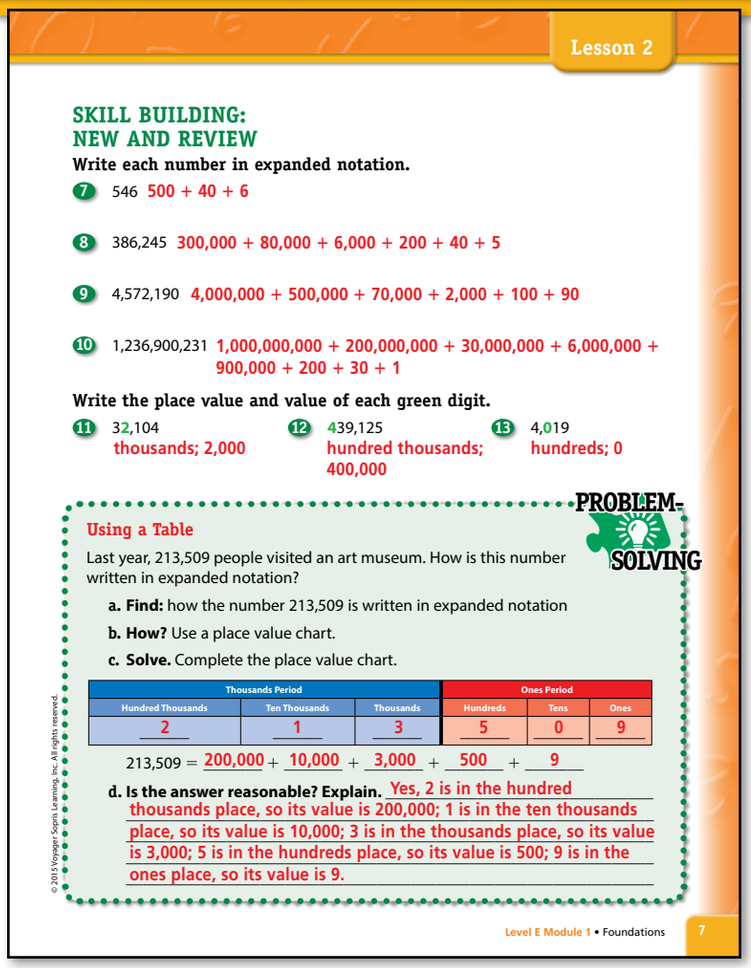
Tell students that a table can be used to help solve a problem. A table can be used to help organize the large number given in the problem.

Have students write the number 213,509 in the place value chart. Be sure that students know to write 0 in the Tens place.

Have students write the value of each digit on the lines. Be sure to mention that because there is a 0 in the Tens place, there is not a line for Tens in the expanded notation.

To check for reasonableness, students can write the addition problem vertically and add:

$$\begin{array}{r} 200{,}000 \\ 10{,}000 \\ 3{,}000 \\ 500 \\ +\quad 9 \\ \hline 213{,}509 \end{array}$$



Lesson 2

SKILL BUILDING: NEW AND REVIEW

Write each number in expanded notation.

7. 546 500 + 40 + 6
8. 386,245 300,000 + 80,000 + 6,000 + 200 + 40 + 5
9. 4,572,190 4,000,000 + 500,000 + 70,000 + 2,000 + 100 + 90
10. 1,236,900,231 1,000,000,000 + 200,000,000 + 30,000,000 + 6,000,000 + 900,000 + 200 + 30 + 1

Write the place value and value of each green digit.

11. 32,104 thousands; 2,000
12. 439,125 hundred thousands; 400,000
13. 4,019 hundreds; 0

PROBLEM-SOLVING

Using a Table

Last year, 213,509 people visited an art museum. How is this number written in expanded notation?

a. Find: how the number 213,509 is written in expanded notation

b. How? Use a place value chart.

c. Solve. Complete the place value chart.

Thousands Period			Ones Period		
Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
2	1	3	5	0	9

213,509 = 200,000 + 10,000 + 3,000 + 500 + 9

d. Is the answer reasonable? Explain. Yes, 2 is in the hundred thousands place, so its value is 200,000; 1 is in the ten thousands place, so its value is 10,000; 3 is in the thousands place, so its value is 3,000; 5 is in the hundreds place, so its value is 500; 9 is in the ones place, so its value is 9.

Problems 7–17

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

CHECK UP

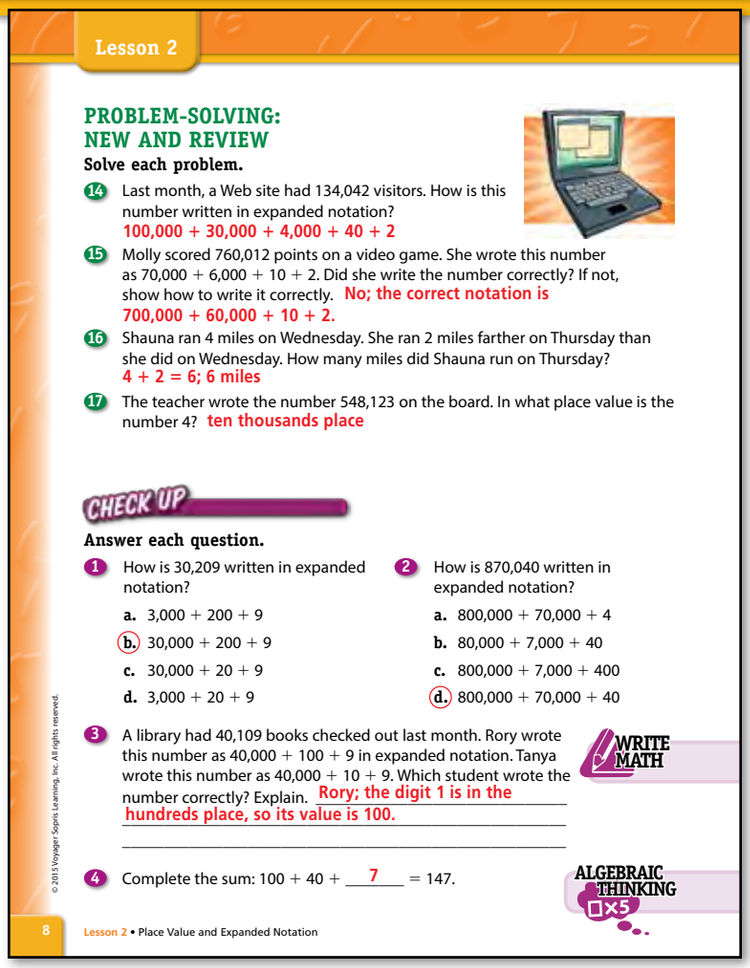
ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered problems 1 or 2 incorrectly: The student did not write the value of one of the digits correctly. Use Additional Resources in E.1.2 to review writing expanded notation for a whole number.

WRITE MATH **If student answered problem 3 incorrectly:** While students work together, review the procedure for writing a whole number in expanded notation. Use Additional Resources in E.1.2 to reteach this concept.



Lesson 2

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

14 Last month, a Web site had 134,042 visitors. How is this number written in expanded notation?
100,000 + 30,000 + 4,000 + 40 + 2

15 Molly scored 760,012 points on a video game. She wrote this number as 70,000 + 6,000 + 10 + 2. Did she write the number correctly? If not, show how to write it correctly. No; the correct notation is 700,000 + 60,000 + 10 + 2.

16 Shauna ran 4 miles on Wednesday. She ran 2 miles farther on Thursday than she did on Wednesday. How many miles did Shauna run on Thursday?
4 + 2 = 6; 6 miles

17 The teacher wrote the number 548,123 on the board. In what place value is the number 4? ten thousands place

CHECK UP

Answer each question.

1 How is 30,209 written in expanded notation?
a. 3,000 + 200 + 9
b. 30,000 + 200 + 9
c. 30,000 + 20 + 9
d. 3,000 + 20 + 9

2 How is 870,040 written in expanded notation?
a. 800,000 + 70,000 + 4
b. 80,000 + 7,000 + 40
c. 800,000 + 7,000 + 400
d. 800,000 + 70,000 + 40

3 A library had 40,109 books checked out last month. Rory wrote this number as 40,000 + 100 + 9 in expanded notation. Tanya wrote this number as 40,000 + 10 + 9. Which student wrote the number correctly? Explain. Rory; the digit 1 is in the hundreds place, so its value is 100.

WRITE MATH

4 Complete the sum: 100 + 40 + 7 = 147.

ALGEBRAIC THINKING

Technology

Have students review the Animated Glossary on VmathLive for reinforcement of math vocabulary. Additional digital content is available through this feature in the eBook.

DIFFERENTIATION

Additional Resources

Vmath Reteach

Reteach Student Book Module 1 Lesson 2

Reteach Teacher Edition Module 1 Lesson 2

Extra Practice

Student Book page 35

English Language Learners

Use the VmathLive Animated Glossary to review the terms *digit*, *place value*, and *expanded notation*. Demonstrate the vocabulary at the beginning of the lesson as students gather around the computer screen or through a projection system if possible.

Prepare digit cards that have the numbers 0–9 on them. Pair students up and tell them they are going to choose digit cards and write numbers in expanded notation. Give each pair of students a sheet of paper to record their numbers. Tell students that first they will pick four digit cards and write a 4-digit number. A 0 cannot be used in the thousands place. Have students alternate picking the digit cards and recording the numbers until they have a 4-digit number. For example, if students pick 2, 5, 7, and 8, they will write 2,578 on their paper. Ask students to identify the value of each digit, then write the number in expanded notation.

Students with Special Needs

Create a sentence strip that shows the number 14,863 in expanded notation. Fold the sentence strip so that only the digits are shown. Have a student read the number aloud. As a class, discuss the value of each digit. As each value is revealed, starting with the ten thousands, unfold the sentence strip to show the value written in expanded notation.

Lesson 3

Objective

To write a whole number through one billion using words

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

The model represents a number. Each hundreds flat has 10 rows and 10 columns, which represent 1 hundred. Each tens rod represents 10, and each ones block represents 1. How many hundreds are shown? (4) **Write this number on the line before the word *hundreds*. How many tens are shown?** (6) **Write this number on the line before the word *tens*. How many ones are shown?** (7) **Write this number on the line before the word *ones*.**

What is the value of 4 hundreds? (400) **Write 400 on the first line in problem 1b. What is the value of 6 tens?** (60) **Write 60 on the middle line. What is the value of 7 ones?** (7) **Write 7 on the last line.**

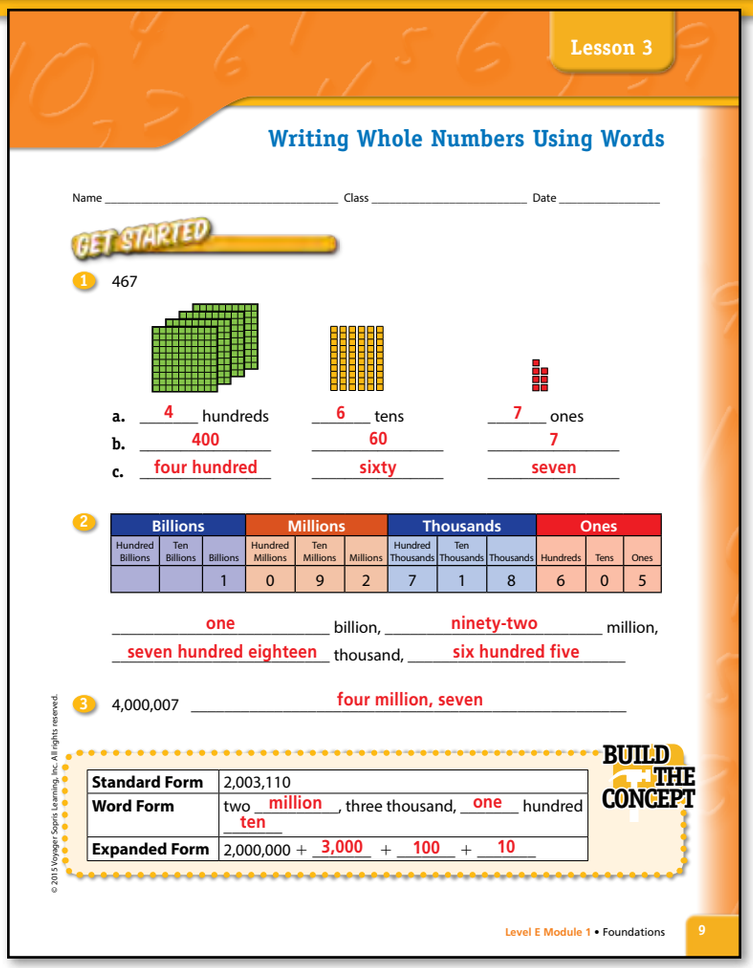
Look at problem 1c. How is 400 written using words? (four hundred) **How is 60 written using words?** (sixty) **How is 7 written using words?** (seven)

MODEL NEW SKILLS

Problem 2

The chart shows place value through billions. The top row of the chart lists the names of the periods. The second row tells the place value of each digit in a number. The third row is for the number.

Look at the digits in the chart. The digits in the billions period tell how many billions are in a number. Look at the words under the chart. Notice that a comma separates the billions period from the millions period. Another comma separates the millions period from the thousands period, and a comma separates the thousands period from the ones period. Commas separate periods in a number.



Lesson 3

Writing Whole Numbers Using Words

Name _____ Class _____ Date _____

GET STARTED

1 467

a. 4 hundreds 6 tens 7 ones

b. 400 60 7

c. four hundred sixty seven

2

Billions			Millions			Thousands			Ones		
Hundred Billions	Ten Billions	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		1	0	9	2	7	1	8	6	0	5

one billion, ninety-two million, seven hundred eighteen thousand, six hundred five

3 4,000,007 four million, seven

BUILD THE CONCEPT

Standard Form	2,003,110
Word Form	two million, three thousand, one hundred ten
Expanded Form	2,000,000 + 3,000 + 100 + 10

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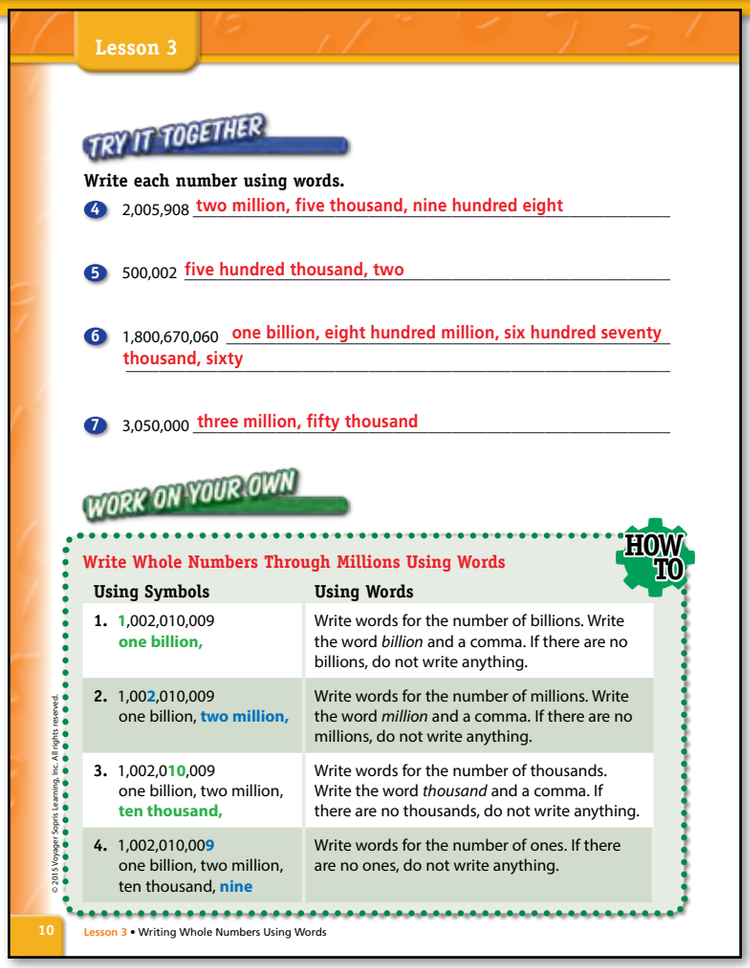
The chart can be used to write the number using words. Look at the digits in the billions period. What is in the billions period? (1) **How is the number 1 written using words?** (one)

What period is to the right of the billions period? (millions) **The 0 in the millions period is a placeholder to show that there are no hundred millions. There are 9 ten millions and 2 millions. How many total millions are in the number?** (92) **How is the number 92 written using words?** (ninety-two)

What period is to the right of the millions period? (thousands) **How many total thousands are in the number?** (718) **How is the number 718 written using words?** (seven hundred eighteen)

What period do the digits to the right of the third comma represent? (ones) **What number is in the ones period?** (605) **How is the number 605 written using words?** (six hundred five) **This number is read as *one billion, ninety-two million, seven hundred eighteen thousand, six hundred five*.**



Lesson 3

TRY IT TOGETHER

Write each number using words.

4. 2,005,908 two million, five thousand, nine hundred eight

5. 500,002 five hundred thousand, two

6. 1,800,670,060 one billion, eight hundred million, six hundred seventy thousand, sixty

7. 3,050,000 three million, fifty thousand

WORK ON YOUR OWN

HOW TO

Write Whole Numbers Through Millions Using Words

Using Symbols	Using Words
1. 1,002,010,009 one billion,	Write words for the number of billions. Write the word *billion* and a comma. If there are no billions, do not write anything.
2. 1,002,010,009 one billion, two million,	Write words for the number of millions. Write the word *million* and a comma. If there are no millions, do not write anything.
3. 1,002,010,009 one billion, two million, ten thousand,	Write words for the number of thousands. Write the word *thousand* and a comma. If there are no thousands, do not write anything.
4. 1,002,010,009 one billion, two million, ten thousand, nine	Write words for the number of ones. If there are no ones, do not write anything.

Problem 3

How many millions are in this number? (4) **How is the number 4 written using words?** (four) **What word should follow *four*?** (million) **What should be written after the word *million*?** (a comma) **Why?** (Commas are used to separate periods.)

How many thousands are in this number? (0) **Because 0 thousands are in this number, no words are written for the thousands period. How many ones are in this number?** (7) **How is the number 7 written using words?** (seven) **Write *seven* after the comma. This number is read as *four million, seven*.**

BUILD THE CONCEPT

Model how to write a whole number in word form and in expanded notation.

A number can be expressed many ways. One way is the standard form. This is shown in the first row of the chart. What number is shown in standard form? (2,003,110)

Look at the second row. A number can also be expressed in word form. How is the standard form number 2,003,110 expressed in words? (two million, three thousand, one hundred ten) **Fill in the missing words in the table.**

Last, look at the third row in the table. Another way to write a number is in expanded notation. Expanded notation is also called expanded form. To write a number using expanded form, be sure to include every place value represented in the number. What is the greatest place value in the number shown? (millions) **Looking at the table, what is the first value in the expanded form?** (2,000,000)

Now, what is the next place value that should be written in expanded form? (thousands) **What is the next value for the expanded form of the number?** (3,000) **What are the last two values of the expanded form?** (100 and 10) **How is 2,003,110 written in expanded form?** (2,000,000 + 3,000 + 100 + 10)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 4

How many millions are in this number? (2) **What words should be written for the value of the period?** (two million) **What should follow the words *two million*?** (a comma)

How many thousands are in this number? (5) **What words should be written for the value of this period?** (five thousand) **What should follow the words *five thousand*?** (a comma) **How many ones are in this number?** (908) **How is 908 written using words?** (nine hundred eight) **This number is read as *two million, five thousand, nine hundred eight*.**

Problem 5

Are there any millions in this number? (no) **How many thousands are in this number?** (500) **What words should be written for the value of this period?** (five hundred thousand) **How many ones are in this number?** (2) **How is this number written using words?** (five hundred thousand, two)

Problem 6

What words should be written for the value of the billions period? (one billion) **What should follow the words *one billion*?** (a comma) **What words should be written for the value of the millions period?** (eight hundred million) **What should be written after the words *eight hundred million*?** (a comma) **What words should be written for the value of the thousands period?** (six hundred seventy thousand) **What should be written after the words *six hundred seventy thousand*?** (a comma)

How many ones are in this number? (60) **How is this number written using words?** (one billion, eight hundred million, six hundred seventy thousand, sixty)

Problem 7

What should be written for the value of the millions period? (three million) **What should be written for the value of the thousands period?** (fifty thousand) **How is this number written using words?** (three million, fifty thousand)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

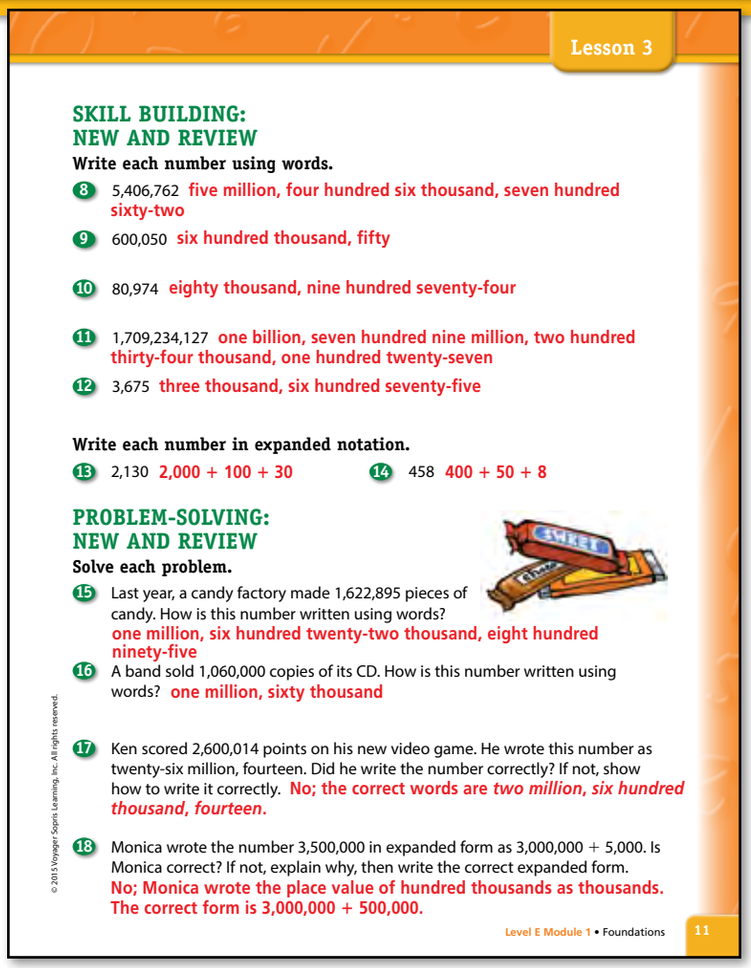
Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 8–18

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problem 17 **Reminder**

Review with students that commas separate the period names.



Lesson 3

SKILL BUILDING: NEW AND REVIEW

Write each number using words.

8. 5,406,762 five million, four hundred six thousand, seven hundred sixty-two
9. 600,050 six hundred thousand, fifty
10. 80,974 eighty thousand, nine hundred seventy-four
11. 1,709,234,127 one billion, seven hundred nine million, two hundred thirty-four thousand, one hundred twenty-seven
12. 3,675 three thousand, six hundred seventy-five

Write each number in expanded notation.

13. 2,130 2,000 + 100 + 30
14. 458 400 + 50 + 8

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

15. Last year, a candy factory made 1,622,895 pieces of candy. How is this number written using words? one million, six hundred twenty-two thousand, eight hundred ninety-five
16. A band sold 1,060,000 copies of its CD. How is this number written using words? one million, sixty thousand
17. Ken scored 2,600,014 points on his new video game. He wrote this number as twenty-six million, fourteen. Did he write the number correctly? If not, show how to write it correctly. No; the correct words are *two million, six hundred thousand, fourteen.*
18. Monica wrote the number 3,500,000 in expanded form as 3,000,000 + 5,000. Is Monica correct? If not, explain why, then write the correct expanded form. No; Monica wrote the place value of hundred thousands as thousands. The correct form is 3,000,000 + 500,000.

CHECK UP

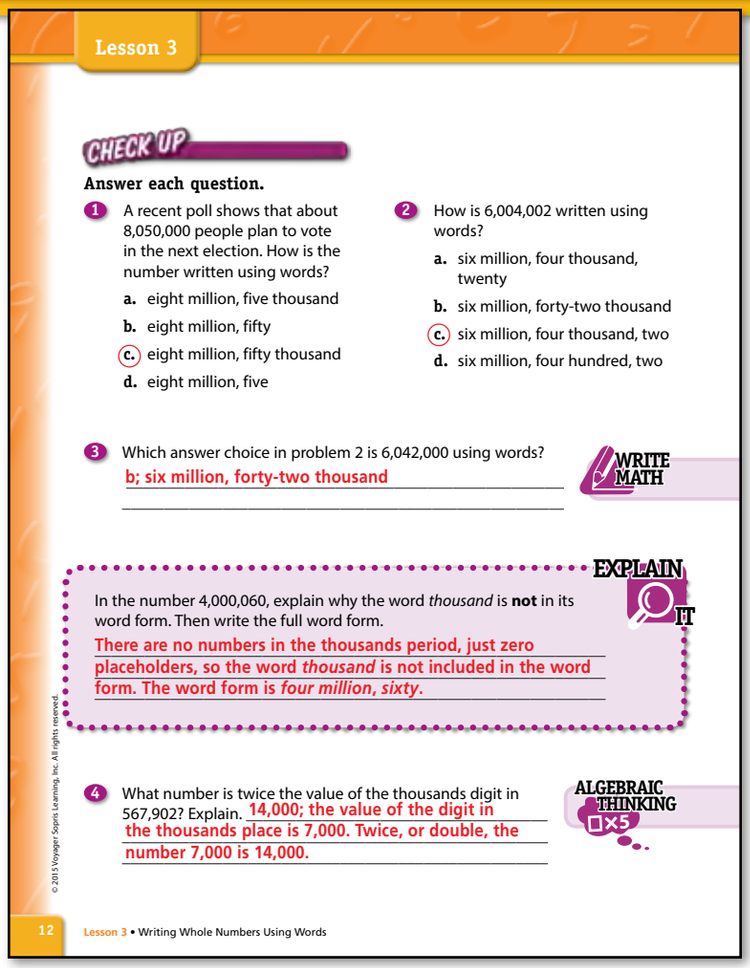
ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a or 2b: The student made a mistake in determining place value in the thousands period. Encourage the student to use a place value chart to write numbers using words.

If student answered 1b or 2a: The student made a mistake in determining place value in the ones period. Encourage the student to use a place value chart to write numbers using words.



Lesson 3

CHECK UP

Answer each question.

1. A recent poll shows that about 8,050,000 people plan to vote in the next election. How is the number written using words?
   - **a.** eight million, five thousand
   - **b.** eight million, fifty
   - **c.** eight million, fifty thousand
   - **d.** eight million, five

2. How is 6,004,002 written using words?
   - **a.** six million, four thousand, twenty
   - **b.** six million, forty-two thousand
   - **c.** six million, four thousand, two
   - **d.** six million, four hundred, two

3. Which answer choice in problem 2 is 6,042,000 using words?
   b; six million, forty-two thousand

WRITE MATH

EXPLAIN IT

In the number 4,000,060, explain why the word *thousand* is **not** in its word form. Then write the full word form.
There are no numbers in the thousands period, just zero placeholders, so the word *thousand* is not included in the word form. The word form is *four million, sixty.*

4. What number is twice the value of the thousands digit in 567,902? Explain. 14,000; the value of the digit in the thousands place is 7,000. Twice, or double, the number 7,000 is 14,000.

ALGEBRAIC THINKING

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student how to write the word form of a number. Use Additional Resources in E.1.3 to reteach how to write a whole number.

EXPLAIN IT

As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.

Technology

Have students use an online search engine to discover other ways to apply writing whole numbers using words in real-life situations. Additional digital content is available through this feature in the eBook.

DIFFERENTIATION

Additional Resources

Vmath Reteach
Reteach Student Book Module 1 Lesson 3
Reteach Teacher Edition Module 1 Lesson 3

Extra Practice
Student Book page 36

English Language Learners

To help students who are struggling with writing place value terms, give them a place value chart. Say *thirty-two thousand,* and have students write each digit in the correct place value in the chart. Be sure students place the 3 in the ten thousands place. Ask what digits belong in the thousands place and the hundreds place. Have students repeat the number. Repeat the activity with numbers up to one billion.

Students with Special Needs

To help students who are having difficulty writing and saying whole numbers, give them a place value chart. Say *one million, three hundred six thousand, four hundred eighty-nine*. Now repeat the number, saying one period at a time, and have students write digits in their place value chart.

Demonstrate with 1 billion and model how to place the digits in the correct place value. Write the words *one billion* under the chart. Repeat with the millions, thousands, and ones periods using zeros as placeholders. Tell students that although they have written the number in words, they still need to write the commas. Have a student come to the board and write the commas between the periods. Once the word form of the number is complete, have students read the word name aloud.

Lesson 4

Objective

To write a whole number through one billion using digits

Preskills	Lesson
Writing Whole Numbers Using Words	E.1.3

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

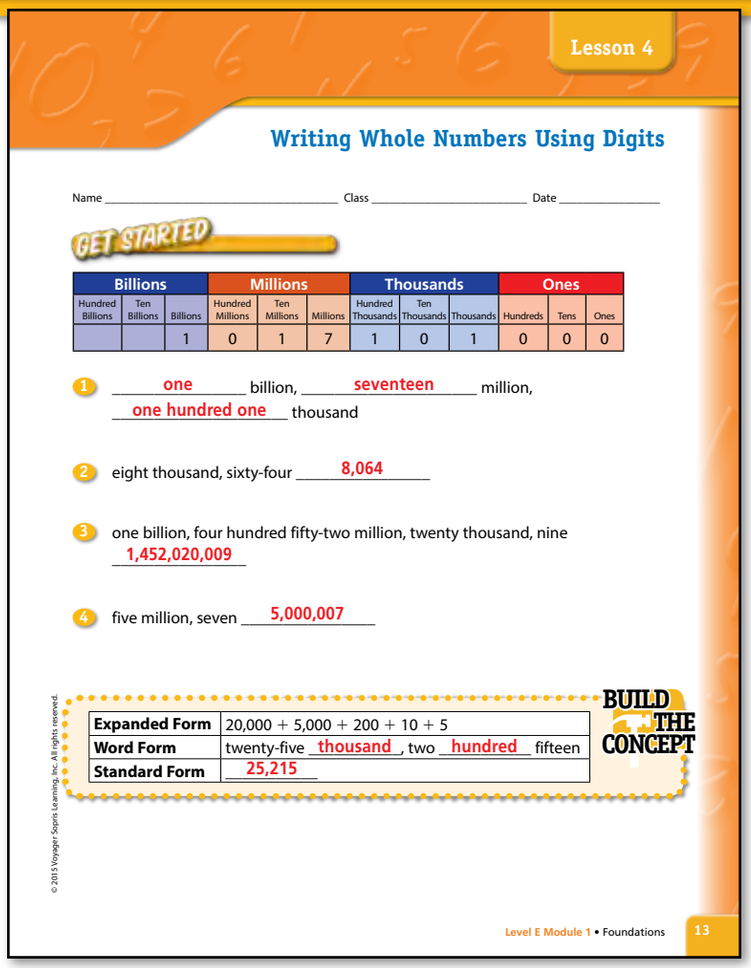
The chart shows place value through billions. What is in the billions period? (1) **How is the number 1 written using words?** (one) **What period is to the right of the billions period?** (millions) **How many millions are in the number?** (17) **How is the number 17 written using words?** (seventeen) **What period is to the right of the millions period?** (thousands) **How many thousands are in the number?** (101) **How is the number 101 written using words?** (one hundred one)

What period do the digits in the last period represent? (ones) **How many ones are in this number?** (0) **Because there are no ones, no words are written for the ones period.**

MODEL NEW SKILLS

Problem 2

This problem is read as *eight thousand, sixty-four*. Which period do the words to the left of the comma represent? (thousands) **Why?** (The word *thousand* is there.) **What digit should be written in the thousands period?** (8) **Write a comma after the 8 to separate the thousands and ones periods. What are the words after the word *thousand*?** (sixty-four) **How is *sixty-four* written using digits?** (64) **In which period does 64 belong?** (ones) **Why?** (The word *million* or *thousand* does not appear after sixty-four.) **A zero must be used as a placeholder in the hundreds place because the word *hundred* does not appear after the comma. *Eight thousand, sixty-four* is written as 8,064 using digits.**



Lesson 4

Writing Whole Numbers Using Digits

Name _____ Class _____ Date _____

GET STARTED

Billions			Millions			Thousands			Ones		
Hundred Billions	Ten Billions	Billions	Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		1	0	1	7	1	0	1	0	0	0

1. ___one___ billion, ___seventeen___ million, ___one hundred one___ thousand
2. eight thousand, sixty-four ___8,064___
3. one billion, four hundred fifty-two million, twenty thousand, nine ___1,452,020,009___
4. five million, seven ___5,000,007___

BUILD THE CONCEPT

Expanded Form	20,000 + 5,000 + 200 + 10 + 5
Word Form	twenty-five ___thousand___, two ___hundred___ fifteen
Standard Form	___25,215___

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Problem 3

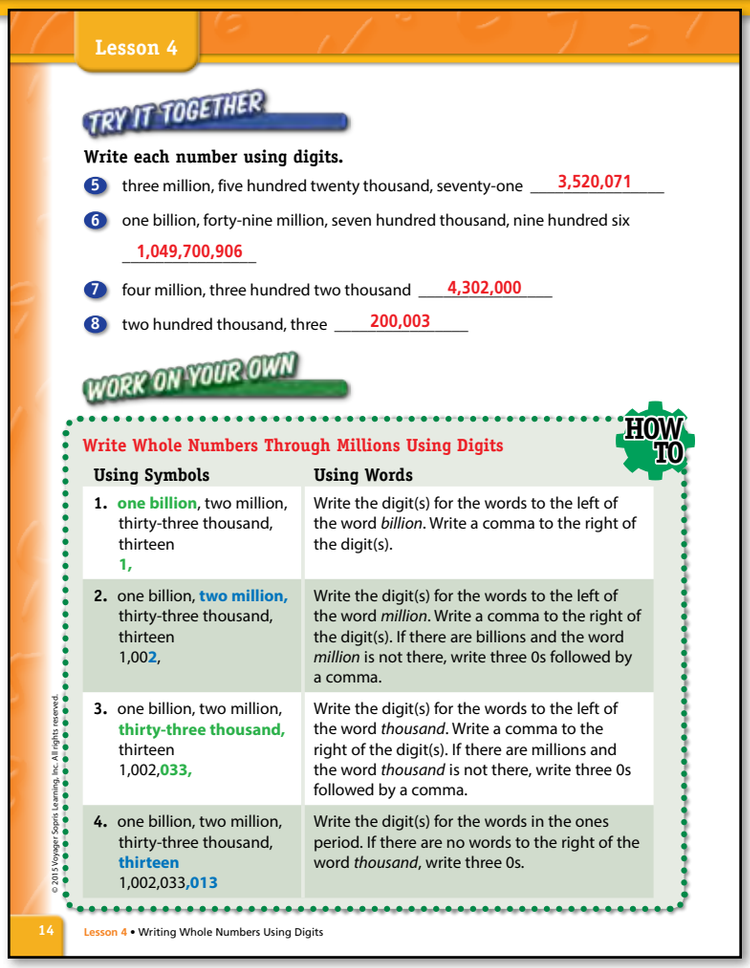
How many periods are in this number? (four) **What are the four periods?** (billions, millions, thousands, and ones) **What word appears before the word *billion*?** (one) **How is the *one* written using digits?** (1) **What should be written after 1?** (a comma)

What words are written after the word *billion*? (four hundred fifty-two million) **How is *four hundred fifty-two* written using digits?** (452) **What should be written after 452?** (a comma)

What words are written after the word *million*? (twenty thousand) **How is *twenty* written using digits?** (20) **Because no hundreds are with the 20, a zero must be used as a placeholder. What three digits should be written in the thousands period?** (020) **What should be written after 020?** (a comma)

What word is written after the word *thousand*? (nine) **How is *nine* written using digits?** (9) **Because no hundreds or tens are with the 9, two zeros must be used as placeholders. What three digits should be written in the ones period?** (009)

How is *one billion, four hundred fifty-two million, twenty thousand, nine* written using digits? (1,452,020,009)



Lesson 4

TRY IT TOGETHER

Write each number using digits.

5. three million, five hundred twenty thousand, seventy-one 3,520,071
6. one billion, forty-nine million, seven hundred thousand, nine hundred six 1,049,700,906
7. four million, three hundred two thousand 4,302,000
8. two hundred thousand, three 200,003

WORK ON YOUR OWN

HOW TO

Write Whole Numbers Through Millions Using Digits

Using Symbols	Using Words
1. **one billion**, two million, thirty-three thousand, thirteen **1,**	Write the digit(s) for the words to the left of the word *billion*. Write a comma to the right of the digit(s).
2. one billion, **two million,** thirty-three thousand, thirteen 1,002**,**	Write the digit(s) for the words to the left of the word *million*. Write a comma to the right of the digit(s). If there are billions and the word *million* is not there, write three 0s followed by a comma.
3. one billion, two million, **thirty-three thousand,** thirteen 1,002,**033,**	Write the digit(s) for the words to the left of the word *thousand*. Write a comma to the right of the digit(s). If there are millions and the word *thousand* is not there, write three 0s followed by a comma.
4. one billion, two million, thirty-three thousand, **thirteen** 1,002,033,**013**	Write the digit(s) for the words in the ones period. If there are no words to the right of the word *thousand*, write three 0s.

Problem 4

What word appears before the word *million*? (five) **How is *five* written using digits?** (5) **What should be written after 5?** (a comma) **Are there any thousands in this number?** (no) **Why not?** (The word *thousand* does not appear after the comma.) **What three digits must be written to indicate there are no thousands?** (000)

What should be written after the three zeros? (a comma) **Are any ones in this number?** (yes) **How many ones are there?** (7) **Zeros must be written as placeholders to indicate there are no hundreds or tens in the ones period. How is this number written using digits?** (5,000,007)

BUILD THE CONCEPT

Model how to write a whole number in word from and in standard form.

A number can be expressed many ways. Three of the more common forms are *expanded form, word form,* and *standard form*. The standard form is the same as writing a number using digits.

Look at the first row in the table. This is the expanded form of a number. How many ten thousands does the number have? (2) **How many thousands?** (5) **How many hundreds?** (2) **How many tens?** (1) **How many ones?** (5)

Now look at the second row. What form is written in this row? (word form) **The word form of a number is written using the periods. How many thousands are there in the thousands period?** (25) **What word should be written after the word *twenty-five*?** (thousand) **What word should be written after the word *two*?** (hundred) **How is this number written in word form?** (twenty-five thousand, two hundred fifteen)

In the last row, how is the number written in standard form, or using digits? (25,215)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

How many millions are in this number? (3) **How is *three* written using digits?** (3) **What should be written next?** (a comma) **Are there any thousands?** (yes) **What words are written before the word *thousand*?** (five hundred twenty) **How is *five hundred twenty* written using digits?** (520) **What should be written next?** (a comma) **How many ones?** (71) **There are no hundreds in the ones period, so what is needed?** (a 0 as a placeholder) **What three digits should be written for the ones period?** (071) **How is *three million, five hundred twenty thousand, seventy-one* written using digits?** (3,520,071)

Problem 6

How many billions are in this number? (1) **What separates the periods?** (a comma) **What words appear before the word *million*?** (forty-nine) **How is *forty-nine* written using digits?** (49) **What words**

are written after the word *million*? (seven hundred thousand) **How is *seven hundred* written using digits?** (700)

How many ones are there? (906) **How is *nine hundred six* written using digits?** (906) **How is this number written using digits?** (1,049,700,906)

Problem 7

How many millions are in this number? (4) **What words are written before the word *thousand*?** (three hundred two) **How many ones are in this number?** (0) **How is this number written using digits?** (4,302,000)

Problem 8

How many millions are in this number? (0) **Are there any thousands?** (yes) **What should be written for the thousands period?** (200) **How many ones?** (3) **How is this number written using digits?** (200,003)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING

This problem illustrates the **Using a Table** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem involving a table. The instruction is immediately followed by application of the strategy in problem 16.

Have students read the problem.

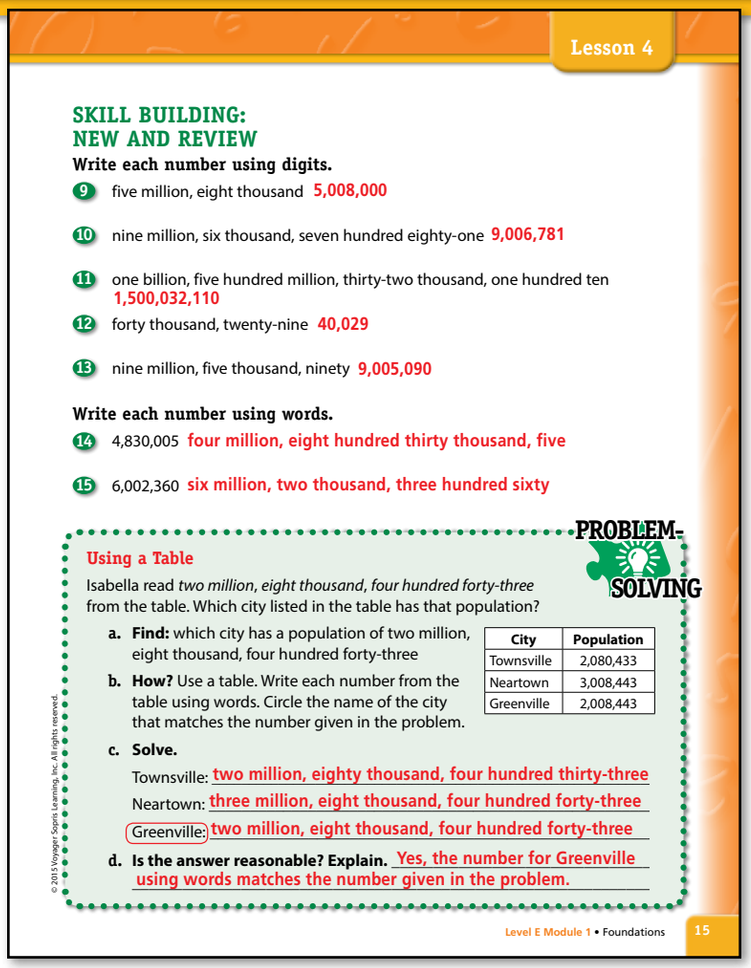
Show students the table and have them read the values in a sentence using words:

"The city of _____ has a population of _____."

Have students then write the populations from the table in words.

Have students look at the problem and find the number written in words. Students should then find the number in words that they wrote.

Finally, students should match the city from the list to the city in the table.



Lesson 4

SKILL BUILDING: NEW AND REVIEW

Write each number using digits.

9. five million, eight thousand 5,008,000
10. nine million, six thousand, seven hundred eighty-one 9,006,781
11. one billion, five hundred million, thirty-two thousand, one hundred ten 1,500,032,110
12. forty thousand, twenty-nine 40,029
13. nine million, five thousand, ninety 9,005,090

Write each number using words.

14. 4,830,005 four million, eight hundred thirty thousand, five
15. 6,002,360 six million, two thousand, three hundred sixty

PROBLEM-SOLVING

Using a Table

Isabella read *two million, eight thousand, four hundred forty-three* from the table. Which city listed in the table has that population?

City	Population
Townsville	2,080,433
Neartown	3,008,443
Greenville	2,008,443

a. **Find:** which city has a population of two million, eight thousand, four hundred forty-three

b. **How?** Use a table. Write each number from the table using words. Circle the name of the city that matches the number given in the problem.

c. **Solve.**

Townsville: two million, eighty thousand, four hundred thirty-three

Neartown: three million, eight thousand, four hundred forty-three

(Greenville): two million, eight thousand, four hundred forty-three

d. **Is the answer reasonable? Explain.** Yes, the number for Greenville using words matches the number given in the problem.

Problems 9–19

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problem 16 **Reminder**

Students must identify a number written in digits from a table.

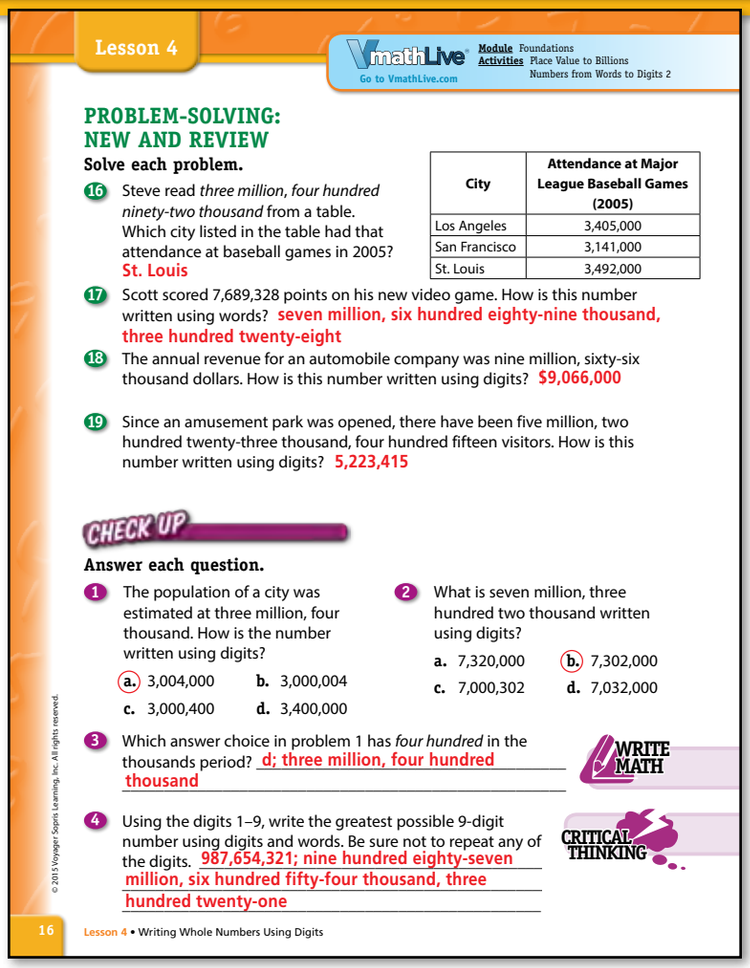
CHECK UP

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1b, 1c, or 2c: The student made a mistake in determining place value in the ones period. Use Additional Resources in E.1.4 to reteach how to write whole numbers using digits.



Lesson 4

VmathLive Go to VmathLive.com
Module Foundations
Activities Place Value to Billions
Numbers from Words to Digits 2

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

City	Attendance at Major League Baseball Games (2005)
Los Angeles	3,405,000
San Francisco	3,141,000
St. Louis	3,492,000

16 Steve read *three million, four hundred ninety-two thousand* from a table. Which city listed in the table had that attendance at baseball games in 2005? St. Louis

17 Scott scored 7,689,328 points on his new video game. How is this number written using words? seven million, six hundred eighty-nine thousand, three hundred twenty-eight

18 The annual revenue for an automobile company was nine million, sixty-six thousand dollars. How is this number written using digits? $9,066,000

19 Since an amusement park was opened, there have been five million, two hundred twenty-three thousand, four hundred fifteen visitors. How is this number written using digits? 5,223,415

CHECK UP

Answer each question.

1 The population of a city was estimated at three million, four thousand. How is the number written using digits?
(a.) 3,004,000 b. 3,000,004
c. 3,000,400 d. 3,400,000

2 What is seven million, three hundred two thousand written using digits?
a. 7,320,000 (b.) 7,302,000
c. 7,000,302 d. 7,032,000

3 Which answer choice in problem 1 has *four hundred* in the thousands period? d; three million, four hundred thousand

WRITE MATH

4 Using the digits 1–9, write the greatest possible 9-digit number using digits and words. Be sure not to repeat any of the digits. 987,654,321; nine hundred eighty-seven million, six hundred fifty-four thousand, three hundred twenty-one

CRITICAL THINKING

16 Lesson 4 • Writing Whole Numbers Using Digits

If student answered 1d, 2a, or 2d: The student made a mistake in determining place value in the thousands period. Use Additional Resources in E.1.4 to reteach how to write whole numbers using digits.

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student how to identify the correct number or period. Use Additional Resources in E.1.4 to reteach how to write whole numbers using digits.

DIFFERENTIATION

Additional Resources

VmathLive
Module: Foundations
Activities: Place Value to Billions
Numbers from Words to Digits 2

Vmath Reteach
Reteach Student Book Module 1 Lesson 4
Reteach Teacher Edition Module 1 Lesson 4

Extra Practice
Student Book page 36

English Language Learners

When writing numbers, students need to place a comma to separate periods. Write *13142* on the board. Tell students that anytime they hear the "period" (billions, millions, or thousands), they should place a comma in the number after the last digit heard before the period name. Read the number *thirteen thousand, one hundred forty-two* aloud. As you read the number, have students place the comma after the 3 when they hear the word *thousand*. Repeat the activity again with other numbers up to one billion.

Students with Special Needs

Allow students to use a place value chart. Write *eighteen thousand, thirty-nine* on the board. After identifying the period of each group of numbers, have students write the number in their place value chart. Ask students if they see any blank places on the chart. Have students write 0 in the hundreds place. This will help students see that any places in the chart that are blank will need zeros as placeholders.

If students placed the 39 in the hundreds and tens place, remind them that they did not hear the word *hundred*, so there should be a 0 in the hundreds place.

HANDS-ON GUIDED DISCOVERY

Lesson 5

Objective

To use base-10 pieces to compare whole numbers

CONCEPTUAL DEVELOPMENT

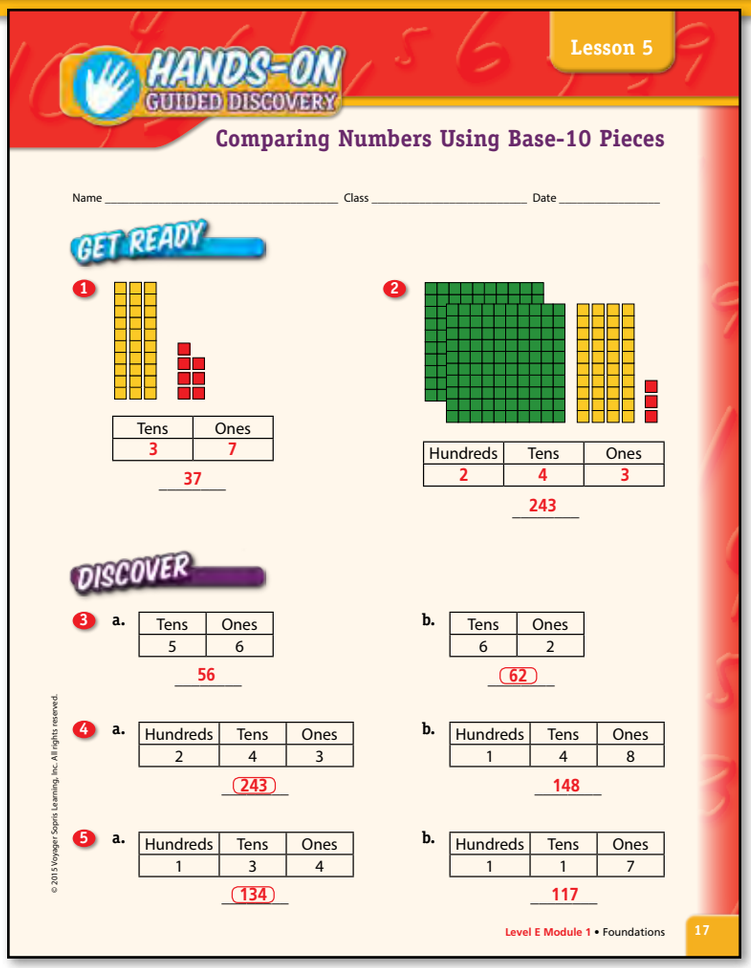
Materials

- base-10 pieces
- grid paper (optional)

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and base-10 pieces.

In this lesson, students will use base-10 pieces to represent and compare whole numbers. Before starting the lesson, help students become familiar or reacquainted with base-10 pieces. While teaching the lesson, be sure students understand they must first compare the number of hundreds flats, then tens rods, and finally ones blocks in their models. These represent the digits in the place value charts for the numbers being compared.


HANDS-ON GUIDED DISCOVERY

Lesson 5

Comparing Numbers Using Base-10 Pieces

Name _____ Class _____ Date _____

GET READY

1

Tens	Ones
3	7

37

2

Hundreds	Tens	Ones
2	4	3

243

DISCOVER

3 a.

Tens	Ones
5	6

56

b.

Tens	Ones
6	2

62

4 a.

Hundreds	Tens	Ones
2	4	3

243

b.

Hundreds	Tens	Ones
1	4	8

148

5 a.

Hundreds	Tens	Ones
1	3	4

134

b.

Hundreds	Tens	Ones
1	1	7

117

GET READY

Problem 1

What types of base-10 pieces do you see in the model for problem 1? (tens rods, ones blocks) **Place these same base-10 pieces on your desk. How many tens rods are there?** (3) **Record this in the place value chart. How many ones blocks are there?** (7) **Record this in the place value chart. What number is modeled in this problem?** (37) **Write 37 on the line below the place value chart.**

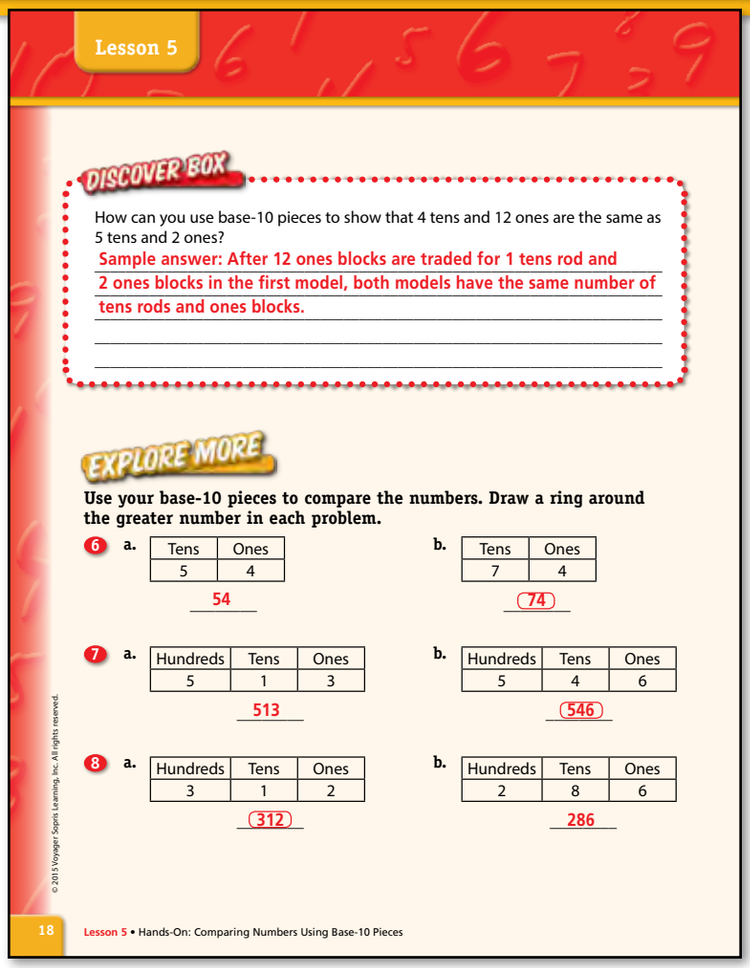
Problem 2

What types of base-10 pieces do you see in the model for problem 2? (hundreds flats, tens rods, ones blocks) **Place these same base-10 pieces on your desk. How many hundreds flats are there?** (2) **Record this in the hundreds place of the place value chart. How many tens rods are there?** (4) **Record this in the tens place of the place value chart. How many ones blocks are there?** (3) **Record this in the ones place of the place value chart. What number is modeled in this problem?** (243) **Write 243 on the line.**

DISCOVER

Problem 3

Look at the number in the place value chart in problem 3a. To model the tens place, how many tens rods do you need? (5) **Place 5 tens rods on your desk. How many ones blocks do you need?** (6) **Place 6 ones blocks on your desk. What number is modeled?** (56) **Write 56 on the line below the place value chart in problem 3a. Look at the number in problem 3b. How many tens rods do you need?** (6) **Place 6 tens rods on your desk. How many ones blocks do you need?** (2) **Place 2 ones blocks on your desk. What number is modeled by the blocks?** (62) **Write 62 on the line below the place value chart in problem 3b. The greatest place value in 56 and 62 is tens. To compare these numbers using base-10 pieces, first compare the number of tens rods used to model each number. We used 5 tens rods in the model of 56 and 6 tens rods in the model of 62.**



Lesson 5

DISCOVER BOX

How can you use base-10 pieces to show that 4 tens and 12 ones are the same as 5 tens and 2 ones?

Sample answer: After 12 ones blocks are traded for 1 tens rod and 2 ones blocks in the first model, both models have the same number of tens rods and ones blocks.

EXPLORE MORE

Use your base-10 pieces to compare the numbers. Draw a ring around the greater number in each problem.

6 a.

Tens	Ones
5	4

54

b.

Tens	Ones
7	4

(74)

7 a.

Hundreds	Tens	Ones
5	1	3

513

b.

Hundreds	Tens	Ones
5	4	6

(546)

8 a.

Hundreds	Tens	Ones
3	1	2

(312)

b.

Hundreds	Tens	Ones
2	8	6

286

18 Lesson 5 • Hands-On: Comparing Numbers Using Base-10 Pieces

The number with the greater number of tens rods is greater. Which model shows the greater value, the model for 56 or the model for 62? (62) **How do you know?** (It has more tens rods.) **Draw a ring around 62.**

Problem 4

Look at the charts in problem 4. What types of base-10 pieces do you need to model the numbers? (hundreds flats, tens rods, ones blocks) **How many hundreds flats do you need for problem 4a?** (2) **Place 2 hundreds flats on your desk. How many tens rods do you need?** (4) **Place 4 tens rods on your desk. How many ones blocks do you need?** (3) **Place 3 ones blocks on your desk. What value is modeled by these pieces?** (243) **Write 243 on the line below the chart in problem 4a. Now look at the chart in problem 4b. How many hundreds flats do you need?** (1) **Place 1 hundreds flat on your desk. How many tens rods do you need?** (4) **Place 4 tens rods on your desk. How many ones blocks do you need?** (8) **Place 8 ones blocks on your desk. What value is modeled by these base-10 pieces?** (148) **Write 148 on the line below the place value chart in problem 4b. What is the greatest place value in these models?** (hundreds) **To compare these numbers using base-10 pieces, first compare the number of hundreds flats used to model each number. Which model has more hundreds flats?** (model of 243) **Which number is greater, 243 or 148?** (243) **Draw a ring around 243.**

Problem 5

What is the number in the chart in problem 5a? (134) **Which base-10 pieces will you need to model 134?** (1 hundreds flat, 3 tens rods, and 4 ones blocks) **Place these base-10 pieces on your desk to model 134. What is the number in the chart in problem 5b?** (117) **Which base-10 pieces will you use to model 117?** (1 hundreds flat, 1 tens rod, and 7 ones blocks) **Place these base-10 pieces on your desk to model 117. What is the greatest place value in these models?** (hundreds) **How many hundreds flats did you use to model 134?** (1) **How many hundreds flats did you use to model 117?** (1) **Because both numbers have the same number of hundreds flats, we must look at the number of tens rods to compare the numbers. How many tens rods did you use to model 134?** (3) **How many tens rods did you use to model 117?** (1) **Which model has more tens rods?** (the model of 134) **Which number is greater?** (134) **Draw a ring around 134.**

Read the problem aloud. **Model 4 tens and 12 ones with base-10 pieces. What value is modeled by the base-10 pieces?** (52) **Model 5 tens and 2 ones with base-10 pieces. What value is modeled by the base-10 pieces?** (52) **How can you use base-10 pieces to show that 4 tens and 12 ones is the same as 5 tens and 2 ones?** (Trade 12 ones blocks for 1 tens rod and 2 ones blocks. Both models will have the same number of tens rods and ones blocks.)

Problems 6–8

Now that students have used base-10 pieces to compare numbers, they can compare numbers on their own. Have them model both numbers for each problem with base-10 pieces, write each value on the line, then circle the greater number.

Gizmos Guided Discovery

Lesson 6

Objective

To investigate comparing whole numbers using a number line

WITH CONCEPTUAL DEVELOPMENT TECHNOLOGY

Materials

- Gizmo: Cannonball Clowns (Number Line Estimation)

Gizmos Log In Instructions

- Log in to vmath.voyagersopris.com using your Username and Password provided in VPORT®.
- Select the Gizmos poster.
- Click on the Cannonball Clowns (Number Line Estimation) Gizmo link.

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and are ready to work at the computers.

Complete problems 1–3 before students log in to the Cannonball Clowns (Number Line Estimation) Gizmo.

Point out to students that they will not be using the target in the lesson.

If students have additional time, have them answer Assessment Questions 1 and 2 in the Gizmo. They can click on the Check Your Answers button to see how well they did on the assessment.

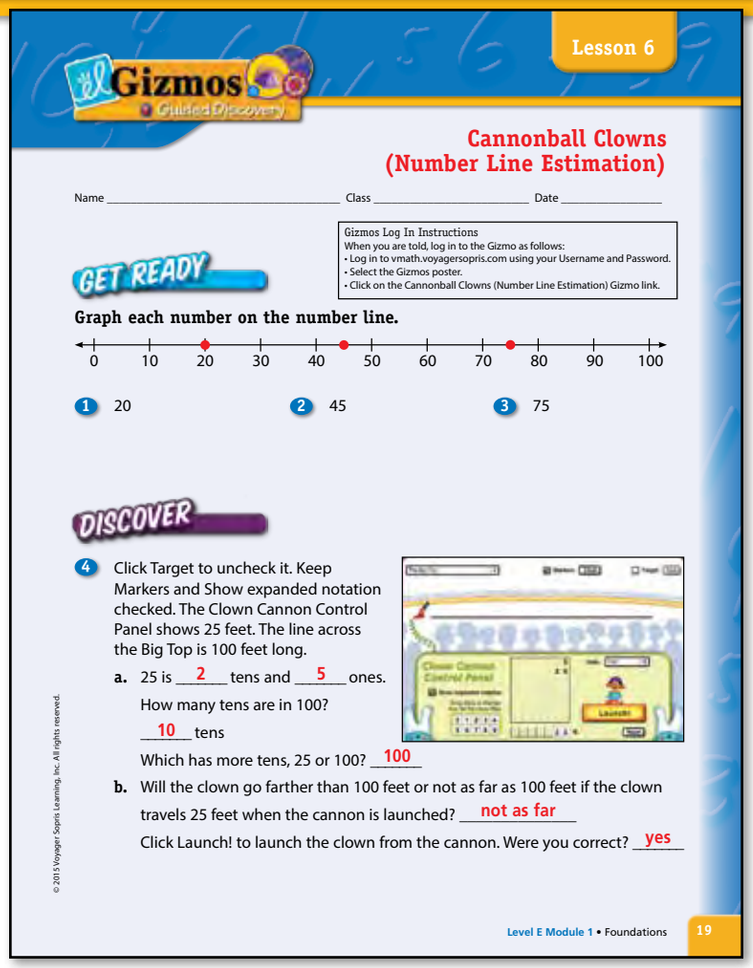
GET READY

Problem 1

A number line can help you visualize where numbers are located with respect to one another. On the number line, between which two whole numbers is 20 located? (10 and 30)

Problem 2

Where is 45 located on the number line? (halfway between 40 and 50)



Gizmos Guided Discovery — Lesson 6

Cannonball Clowns (Number Line Estimation)

Name _____ Class _____ Date _____

Gizmos Log In Instructions
When you are told, log in to the Gizmo as follows:
• Log in to vmath.voyagersopris.com using your Username and Password.
• Select the Gizmos poster.
• Click on the Cannonball Clowns (Number Line Estimation) Gizmo link.

GET READY

Graph each number on the number line.

0 10 20 30 40 50 60 70 80 90 100

1 20 2 45 3 75

DISCOVER

4 Click Target to uncheck it. Keep Markers and Show expanded notation checked. The Clown Cannon Control Panel shows 25 feet. The line across the Big Top is 100 feet long.

a. 25 is 2 tens and 5 ones.
How many tens are in 100?
10 tens
Which has more tens, 25 or 100? 100

b. Will the clown go farther than 100 feet or not as far as 100 feet if the clown travels 25 feet when the cannon is launched? not as far
Click Launch! to launch the clown from the cannon. Were you correct? yes

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Problem 3

Where is 75 located on the number line? (halfway between 70 and 80)

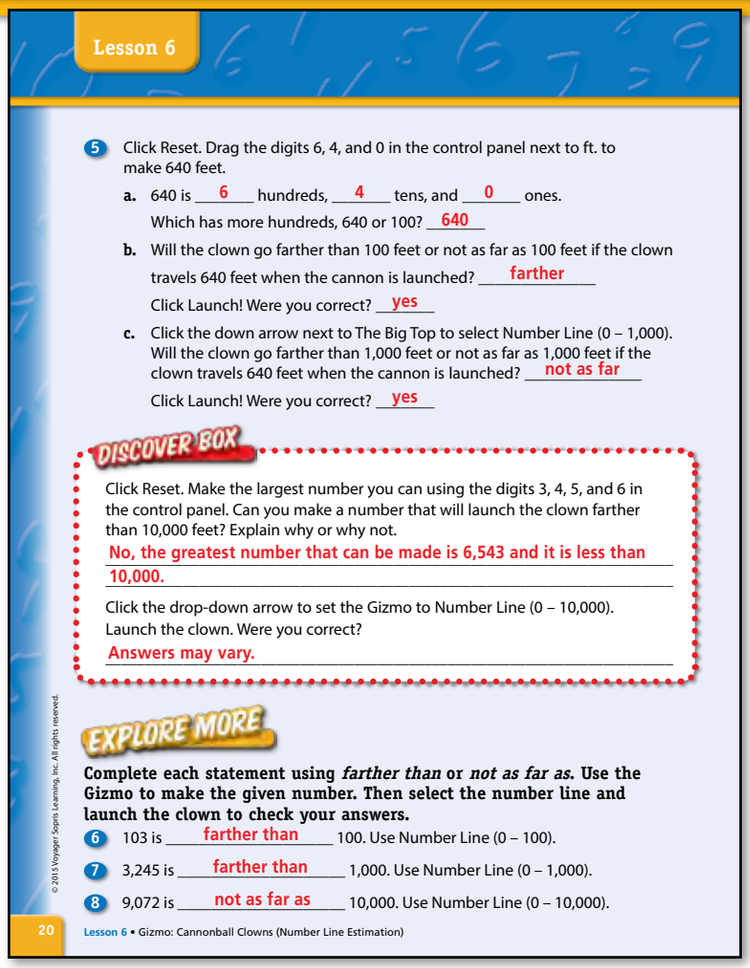
DISCOVER

Problem 4

Have students log in to the Cannonball Clowns (Number Line Estimation) Gizmo using the instructions in the box. Orient them to the Gizmo by reading aloud the description: **Launch clowns from a circus cannon. Drag digit cards on the control panel to set the launch distance. After practicing your clown-launching skills on a number line, move on to the Big Top, Football Field, School Buses, the Golden Gate Bridge, and more!**

Click Target to uncheck its box. Keep the box for Markers checked. In the Clown Cannon Control Panel, also keep the box for Show expanded notation checked.

The Big Top is selected already in the drop-down box. The line across the Big Top is 100 feet long. The Clown Cannon Control Panel shows 25 feet. This is the number of feet the clown is launched over the line.



Lesson 6

5 Click Reset. Drag the digits 6, 4, and 0 in the control panel next to ft. to make 640 feet.

a. 640 is 6 hundreds, 4 tens, and 0 ones.
Which has more hundreds, 640 or 100? 640

b. Will the clown go farther than 100 feet or not as far as 100 feet if the clown travels 640 feet when the cannon is launched? farther
Click Launch! Were you correct? yes

c. Click the down arrow next to The Big Top to select Number Line (0 – 1,000). Will the clown go farther than 1,000 feet or not as far as 1,000 feet if the clown travels 640 feet when the cannon is launched? not as far
Click Launch! Were you correct? yes

DISCOVER BOX

Click Reset. Make the largest number you can using the digits 3, 4, 5, and 6 in the control panel. Can you make a number that will launch the clown farther than 10,000 feet? Explain why or why not.
No, the greatest number that can be made is 6,543 and it is less than 10,000.

Click the drop-down arrow to set the Gizmo to Number Line (0 – 10,000). Launch the clown. Were you correct?
Answers may vary.

EXPLORE MORE

Complete each statement using *farther than* or *not as far as*. Use the Gizmo to make the given number. Then select the number line and launch the clown to check your answers.

6 103 is farther than 100. Use Number Line (0 – 100).

7 3,245 is farther than 1,000. Use Number Line (0 – 1,000).

8 9,072 is not as far as 10,000. Use Number Line (0 – 10,000).

20 Lesson 6 • Gizmo: Cannonball Clowns (Number Line Estimation)

How many tens and how many ones are in the number 25? (2 tens and 5 ones) **How many tens are in 100?** (10 tens) **Which has more tens, 25 or 100?** (100)

Will the clown go farther than 100 feet or not as far as 100 feet if the clown travels 25 feet when the cannon is launched? (not as far)

Click Launch! in the Clown Cannon Control Panel to launch the clown. Were you correct? (yes) **How do you know?** (The clown landed on the line and not beyond it.)

Problem 5

For problem 5, click Reset in the Clown Cannon Control Panel. Drag the digits 6, 4, and 0 in the control panel to make the number 640.

How many hundreds, tens, and ones are in the number 640? (6 hundreds, 4 tens, 0 ones) **Which has more hundreds, 640 or 100?** (640)

Will the clown go farther than 100 feet or not as far as 100 feet if the clown travels 640 feet when the cannon is launched? (farther)

Click Launch! in the Clown Cannon Control Panel to launch the clown. Were you correct? (yes) **How do you know?** (The clown went beyond the end of the number line and flew off the screen.)

Click the down arrow in the drop down-box that says The Big Top to select Number Line (0 – 1,000). Will the clown go farther than 1,000 feet or not as far as 1,000 feet if the clown travels 640 feet when the cannon is launched? (not as far)

Click Launch! to launch the clown. Were you correct? (yes) **How do you know?** (The clown landed on the line and not beyond it.)

Click Reset. Make the largest number you can using the digits 3, 4, 5, and 6. What digit should be in the thousands place to make the largest number? (6) **What digit should be in the hundreds place?** (5) **What digit should be in the tens place?** (4) **What digit should be in the ones place?** (3) **What is the largest number?** (6,543)

Can you make a number that will launch the clown farther than 10,000 feet? (no) **Why not?** (The greatest number that can be made, 6,543, is less than 10,000.)

Set the Gizmo to Number Line (0 – 10,000). Launch the clown. Were you correct? (Answers may vary.)

Problems 6–8

Have students work individually. Remind them to complete a statement first, then use the Gizmo to check the answer.

Extension: Have students or partners explore more ways to compare numbers using a number line.

Lesson 7

Objective

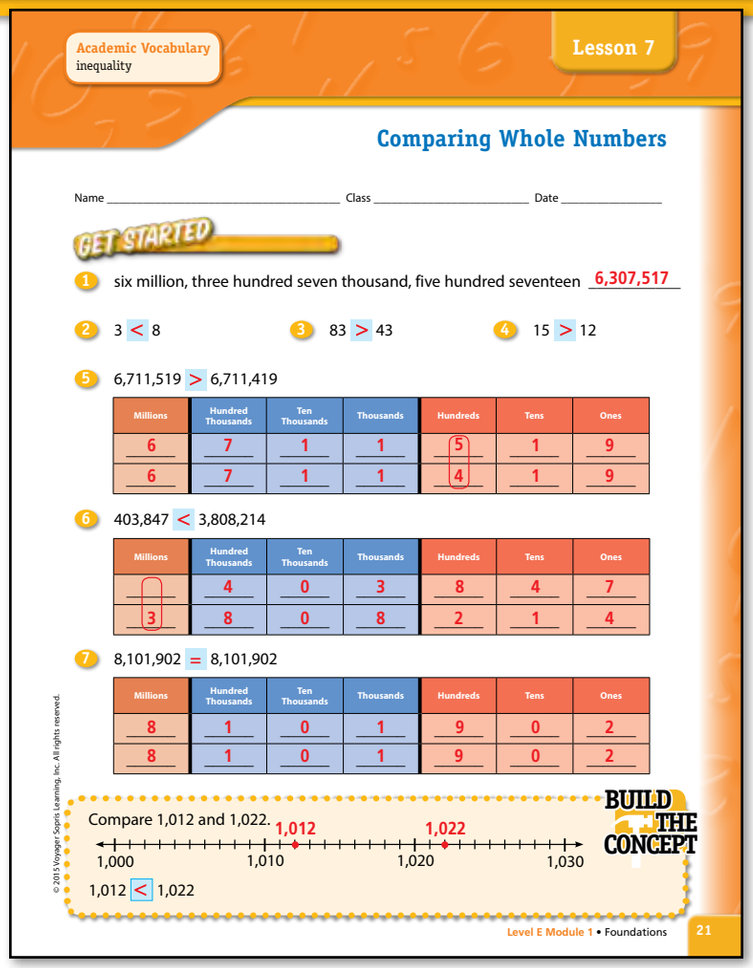
To compare whole numbers through millions

Preskills	Lesson
Writing Whole Numbers Using Digits	E.1.4

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **inequality**
  a sentence that contains the symbols $>$ (greater than) or $<$ (less than)



GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

Read this number and use digits to write it on the line. How is *six million, three hundred seven thousand, five hundred seventeen* written using digits? (6,307,517)

MODEL NEW SKILLS

Problem 2

An inequality symbol shows how two numbers compare. The closed end of an inequality symbol always points to the lesser number.

Look at the numbers 3 and 8. Which number is less? (3) **Write the less than symbol in the blue box. This number sentence is read as *3 is less than 8*. The symbol $<$ stands for *is less than*.**

Problem 3

Look at the numbers 83 and 43. To which number should the inequality symbol point? (43) **Why should it point to 43?** (Forty-three is the lesser number.) **Write the greater than symbol in the blue box. This number sentence is read as *83 is greater than 43*. The symbol $>$ stands for *is greater than*.**

Problem 4

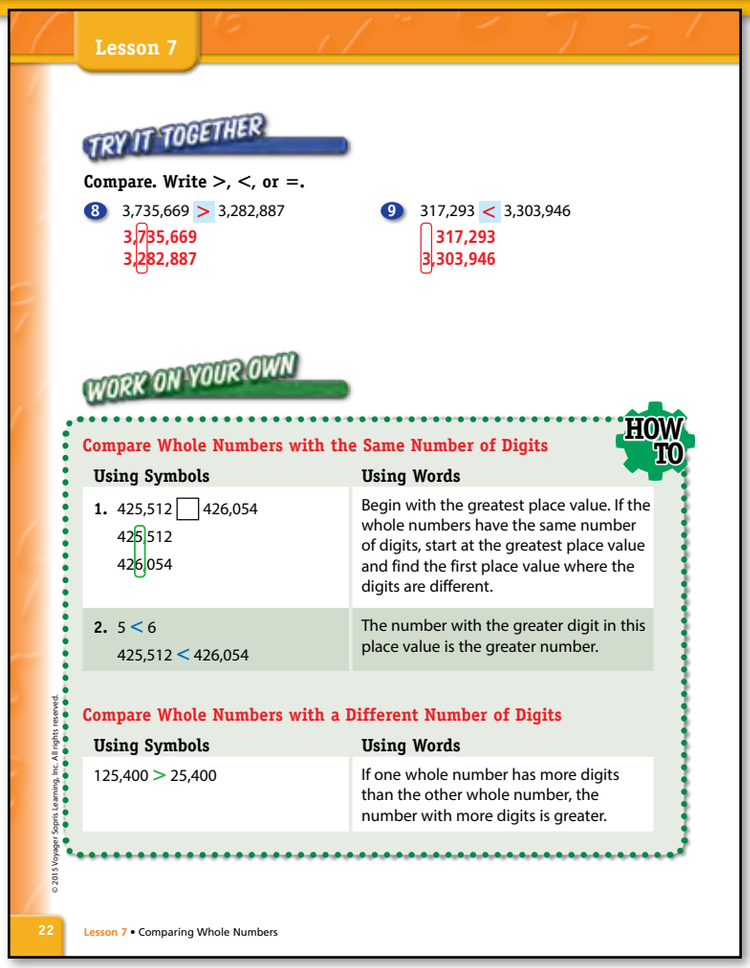
Look at the numbers 15 and 12. Which symbol completes the number sentence? (greater than) **Write the greater than symbol in the blue box. How is this number sentence read?** (Fifteen is greater than 12.)

Problem 5

Two large numbers can be compared by comparing the place value of the digits in the two numbers. Write the numbers 6,711,519 and 6,711,419 in the place value chart. Compare the digits, starting with the digits with the greatest place value.

What is the greatest place value in both numbers? (millions) **What digits are in the millions place?** (6 and 6) **Because these digits are equal and have the same place value, continue by comparing the digits in each place value to the right.**

Where is the first place value the digits are different? (the hundreds place) **What digits are in the hundreds place?** (5 and 4) **Circle the digits in the hundreds place. Which digit is greater?** (5) **Which number is greater, 6,711,519 or 6,711,419?** (6,711,519) **Which inequality symbol completes the number sentence?** ($>$)


Lesson 7

TRY IT TOGETHER

Compare. Write >, <, or =.

8 3,735,669 > 3,282,887
3,735,669
3,282,887

9 317,293 < 3,303,946
317,293
3,303,946

WORK ON YOUR OWN

HOW TO

Compare Whole Numbers with the Same Number of Digits

Using Symbols	Using Words
1. 425,512 ☐ 426,054 425,512 426,054	Begin with the greatest place value. If the whole numbers have the same number of digits, start at the greatest place value and find the first place value where the digits are different.
2. 5 < 6 425,512 < 426,054	The number with the greater digit in this place value is the greater number.

Compare Whole Numbers with a Different Number of Digits

Using Symbols	Using Words
125,400 > 25,400	If one whole number has more digits than the other whole number, the number with more digits is greater.

22 Lesson 7 • Comparing Whole Numbers

Problem 6

Write the numbers 403,847 and 3,808,214 in the place value chart. Compare the numbers starting with the digits with the greatest place value. Notice that the top number does not have a digit in the millions place. This is the first place value where the two numbers differ. Circle the millions place in both numbers.

When two whole numbers have different numbers of digits, the number with fewer digits is always the lesser number. Which number has fewer digits? (403,847) **Which number is less?** (403,847) **To which number should the closed end of the inequality symbol point?** (403,847) **Which inequality symbol completes the number sentence?** (<)

Problem 7

Write the numbers 8,101,902 and 8,101,902 in the place value chart. Do the digits in each place value need to be compared to find the greater number? (yes) **Why?** (The numbers have the same number of digits.) **What is the greatest place value in both numbers?** (millions)

Look at the digits in each place value, starting with the millions place and moving to the right. Where is the first place value the digits are different? (All digits in both numbers are the same.) **The numbers are the same, so an equal sign completes the number sentence.**

BUILD THE CONCEPT

Model how to compare whole numbers using a number line.

A number line can be used to compare two numbers. To compare two numbers, first graph each number on the number line. The number on the left is the lesser number. The number on the right is the greater number.

What is the first number to be graphed? (1,012) **The number 1,012 is 2 tick marks to the right of 1,010. Place a point on the number line at this point and write the number above the line. What is the second number to be graphed?** (1,022) **The number 1,022 is 2 tick marks to the right of 1,020. Place a point on the number line at this point and write the number above the line.**

Is 1,012 to the left of 1,022 or to the right? (to the left) **Is 1,012 less than or greater than 1,022?** (less than) **What symbol should be written in the blue box?** (<) **How is this number sentence read?** (1,012 is less than 1,022.)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 8

Write one number above the other so the digits with the same place values line up. Do these two numbers have the same number of digits? (yes) **Where is the first place value the digits are different?** (hundred thousands) **What digits are in the hundred thousands place?** (7 and 2) **Circle the digits in the hundred thousands place.**

How do these digits compare? (Seven is greater than 2.) **How do the numbers 3,735,669 and 3,282,887 compare?** (3,735,669 is greater than 3,282,887.) **Which symbol completes the number sentence?** (>)

Problem 9

Write one number above the other so the digits line up by place value. Do these two numbers have the same number of digits? (no) **Which number has fewer digits?** (317,293) **Which number is less?** (317,293) **Which symbol completes the number sentence?** (<)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 10–25

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problems 22, 24, and 25 **Reminder**

Tell students that two inequalities can be written when two numbers differ in value. One inequality can compare the numbers using the greater than symbol; another inequality can compare the numbers using the less than symbol.

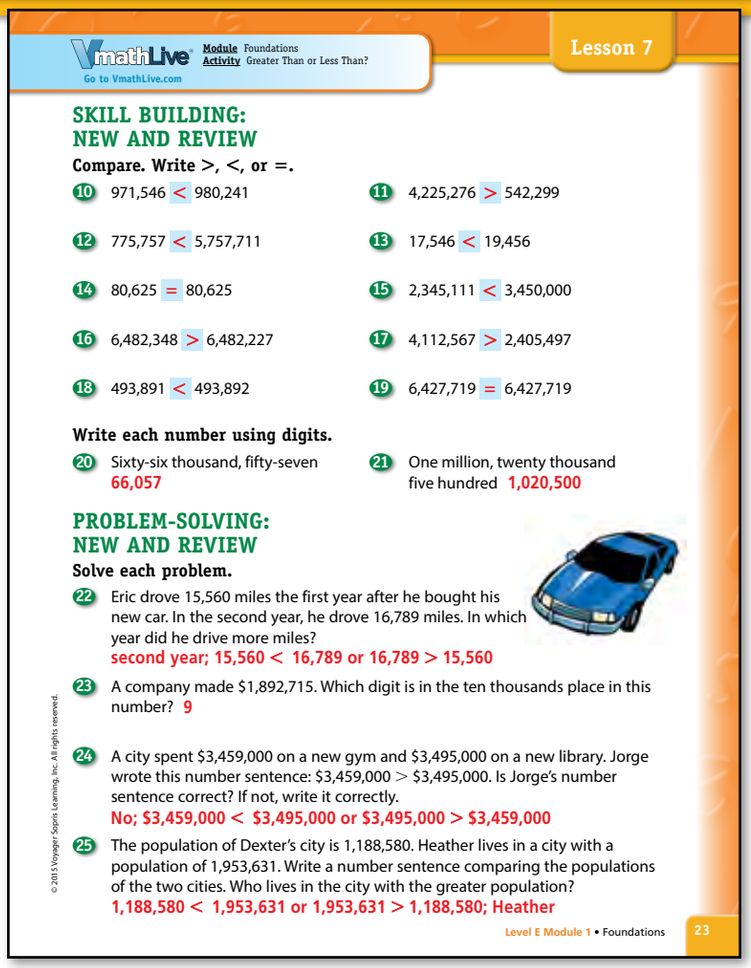
CHECK UP

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered problem 1 incorrectly: The student did not correctly compare the digits in the first place value where the digits differ. Use Additional Resources in E.1.7 to review how to compare whole numbers.



VmathLive Module Activity Foundations Greater Than or Less Than? Go to VmathLive.com

Lesson 7

SKILL BUILDING: NEW AND REVIEW

Compare. Write >, <, or =.

10. 971,546 < 980,241
11. 4,225,276 > 542,299
12. 775,757 < 5,757,711
13. 17,546 < 19,456
14. 80,625 = 80,625
15. 2,345,111 < 3,450,000
16. 6,482,348 > 6,482,227
17. 4,112,567 > 2,405,497
18. 493,891 < 493,892
19. 6,427,719 = 6,427,719

Write each number using digits.

20. Sixty-six thousand, fifty-seven 66,057
21. One million, twenty thousand five hundred 1,020,500

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

22. Eric drove 15,560 miles the first year after he bought his new car. In the second year, he drove 16,789 miles. In which year did he drive more miles?
second year; 15,560 < 16,789 or 16,789 > 15,560

23. A company made $1,892,715. Which digit is in the ten thousands place in this number? 9

24. A city spent $3,459,000 on a new gym and $3,495,000 on a new library. Jorge wrote this number sentence: $3,459,000 > $3,495,000. Is Jorge's number sentence correct? If not, write it correctly.
No; $3,459,000 < $3,495,000 or $3,495,000 > $3,459,000

25. The population of Dexter's city is 1,188,580. Heather lives in a city with a population of 1,953,631. Write a number sentence comparing the populations of the two cities. Who lives in the city with the greater population?
1,188,580 < 1,953,631 or 1,953,631 > 1,188,580; Heather

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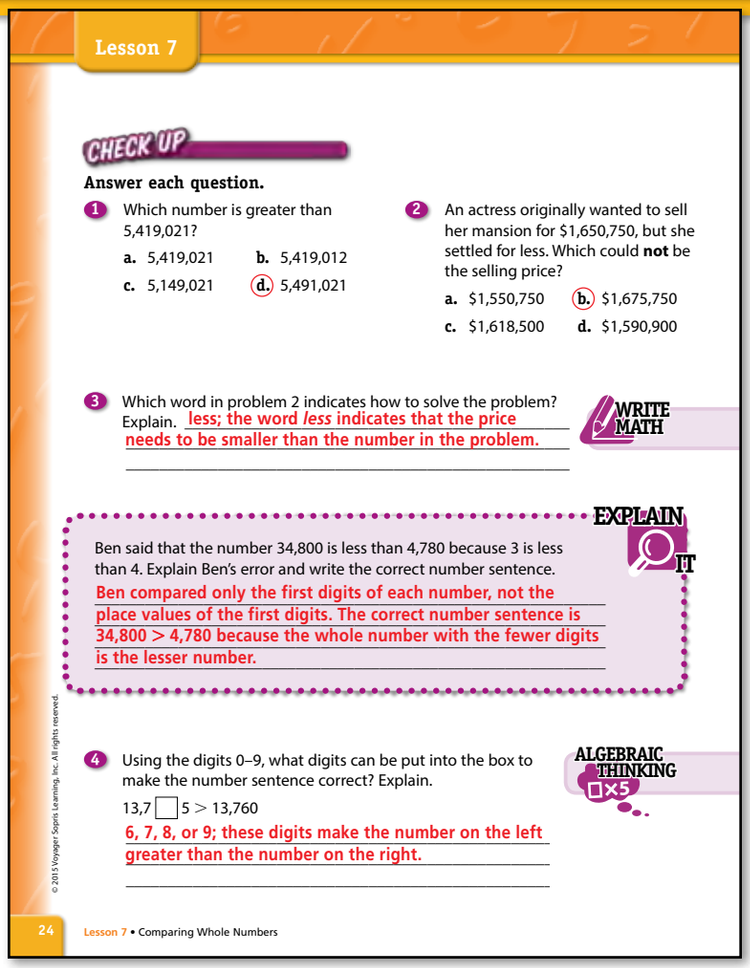
If student answered problem 2 incorrectly: The student compared the numbers incorrectly. Explain to the student that if the actress settled for less, then the selling price must be less than $1,650,750, and thus could not be greater than or equal to $1,650,750.

If student answered problem 3 incorrectly: While students work together, review with the student how to use clue words to solve problems. Remind the student that the word *less* means *smaller*.

As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.



Lesson 7

CHECK UP

Answer each question.

1. Which number is greater than 5,419,021?
   a. 5,419,021 **b.** 5,419,012
   c. 5,149,021 **d.** 5,491,021

2. An actress originally wanted to sell her mansion for $1,650,750, but she settled for less. Which could **not** be the selling price?
   a. $1,550,750 **b.** $1,675,750
   c. $1,618,500 **d.** $1,590,900

3. Which word in problem 2 indicates how to solve the problem? Explain. less; the word *less* indicates that the price needs to be smaller than the number in the problem.

WRITE MATH

EXPLAIN IT

Ben said that the number 34,800 is less than 4,780 because 3 is less than 4. Explain Ben's error and write the correct number sentence.
Ben compared only the first digits of each number, not the place values of the first digits. The correct number sentence is 34,800 > 4,780 because the whole number with the fewer digits is the lesser number.

4. Using the digits 0–9, what digits can be put into the box to make the number sentence correct? Explain.
   13,7 ☐ 5 > 13,760
   6, 7, 8, or 9; these digits make the number on the left greater than the number on the right.

ALGEBRAIC THINKING □×5

24 Lesson 7 • Comparing Whole Numbers

DIFFERENTIATION

Additional Resources

VmathLive
Module: Foundations
Activity: Greater Than or Less Than?

Vmath Reteach
Reteach Student Book Module 1 Lesson 7
Reteach Teacher Edition Module 1 Lesson 7

Extra Practice
Student Book page 37

English Language Learners

Use the VmathLive Animated Glossary to review the terms *greater than symbol* and *less than symbol*. Demonstrate the vocabulary at the beginning of the lesson as students gather around the computer screen or through a projection system if possible.

To help students understand the difference between > and <, create a set of unique numbers through millions on index cards. Pair students up and have each pair choose two numbers to compare. Give each pair index cards with > greater than on one card and < less than on the second card. Have the pairs place one of the signs between the two numbers to compare. Tell students to look at their comparison and see if the opening of the sign is pointing to the greater number. If it is not, have pairs correct the sign and read the comparison aloud. Repeat the activity until all student pairs have correctly compared two numbers.

Students with Special Needs

For students who are having difficulty comparing numbers, give them a sheet of centimeter grid paper. Using centimeter grid paper, write the numbers 350,197 and 301,680, with one on top of the other so that their place values line up. Tell students they can use their grid paper to line up the two numbers to help compare them. Model for students how to write the numbers so that place values line up. Students should begin with the largest place value and compare digits to decide which number is greater. Have students write a number sentence with the correct inequality sign between the two numbers. Repeat with other pairs of numbers.

Lesson 8

Objective

To order whole numbers through millions

Preskills	Lesson
Comparing Whole Numbers	E.1.7

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

To compare these numbers, compare the digits in the first place value in which the digits are different. What is the first place value in which the digits in 7,645,300 and 7,580,999 differ? (hundred thousands)

Which digits are in the hundred thousands place? (6 and 5) **How do 6 and 5 compare?** (Six is greater than 5.) **How do 7,645,300 and 7,580,999 compare?** (7,645,300 is greater than 7,580,999.) **Which symbol should be written in the blue box?** (>)

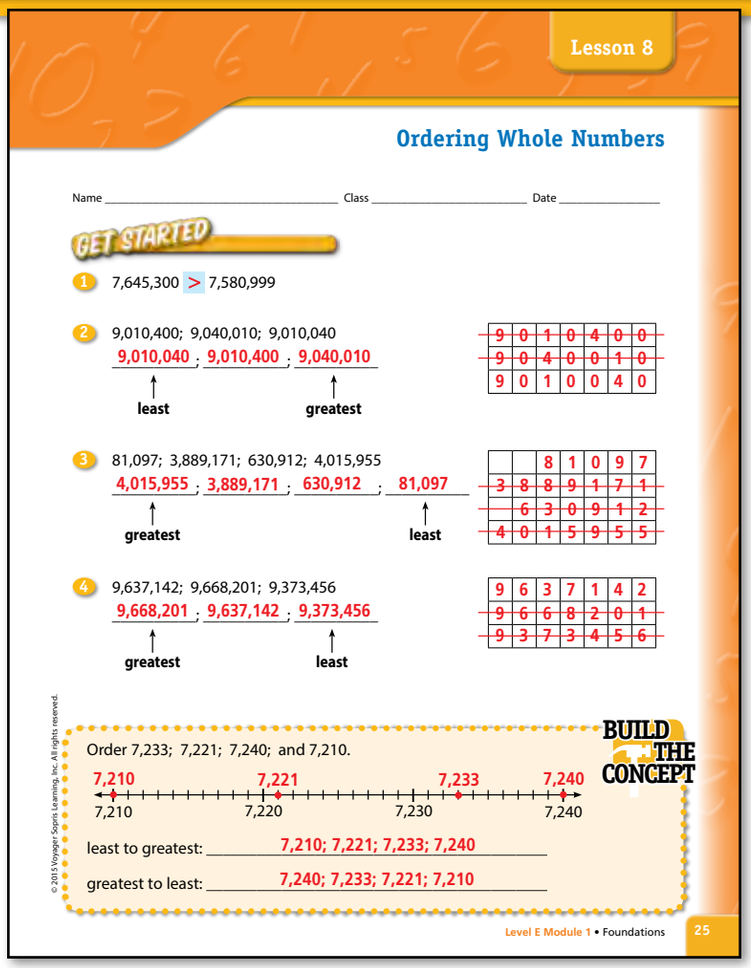
MODEL NEW SKILLS

Problem 2

To order numbers using place value, first write the numbers vertically with the place values lined up. Compare the digits starting with the digits with the greatest place value. What is the greatest place value in all three numbers? (millions) **Which digit is in all three of the millions places?** (9) **Because this digit is equal in each number and has the same place value, continue by comparing the digits in each place value to the right.**

Where do the digits first differ? (ten thousands place) **Find the greatest number first. What is the greatest digit of 1, 1, and 4?** (4) **Then 9,040,010 is the greatest number. Write that number on the line labeled *greatest*. That number can be crossed off in the table.**

Now continue comparing each place value. Where do the numbers differ again? (hundreds place) **What are the different digits?** (4 and 0) **Which digit is greater?** (4) **Then the number 9,010,400 is the greater number.**



Lesson 8

Ordering Whole Numbers

Name _____ Class _____ Date _____

GET STARTED

1. 7,645,300 > 7,580,999

2. 9,010,400; 9,040,010; 9,010,040
   9,010,040 ; 9,010,400 ; 9,040,010
   least greatest

~~9~~	~~0~~	~~1~~	~~0~~	~~4~~	~~0~~	~~0~~
~~9~~	~~0~~	~~4~~	~~0~~	~~0~~	~~1~~	~~0~~
9	0	1	0	0	4	0

3. 81,097; 3,889,171; 630,912; 4,015,955
   4,015,955 ; 3,889,171 ; 630,912 ; 81,097
   greatest least

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

4. 9,637,142; 9,668,201; 9,373,456
   9,668,201 ; 9,637,142 ; 9,373,456
   greatest least

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

BUILD THE CONCEPT

Order 7,233; 7,221; 7,240; and 7,210.

7,210 7,221 7,233 7,240
7,210 7,220 7,230 7,240

least to greatest: 7,210; 7,221; 7,233; 7,240

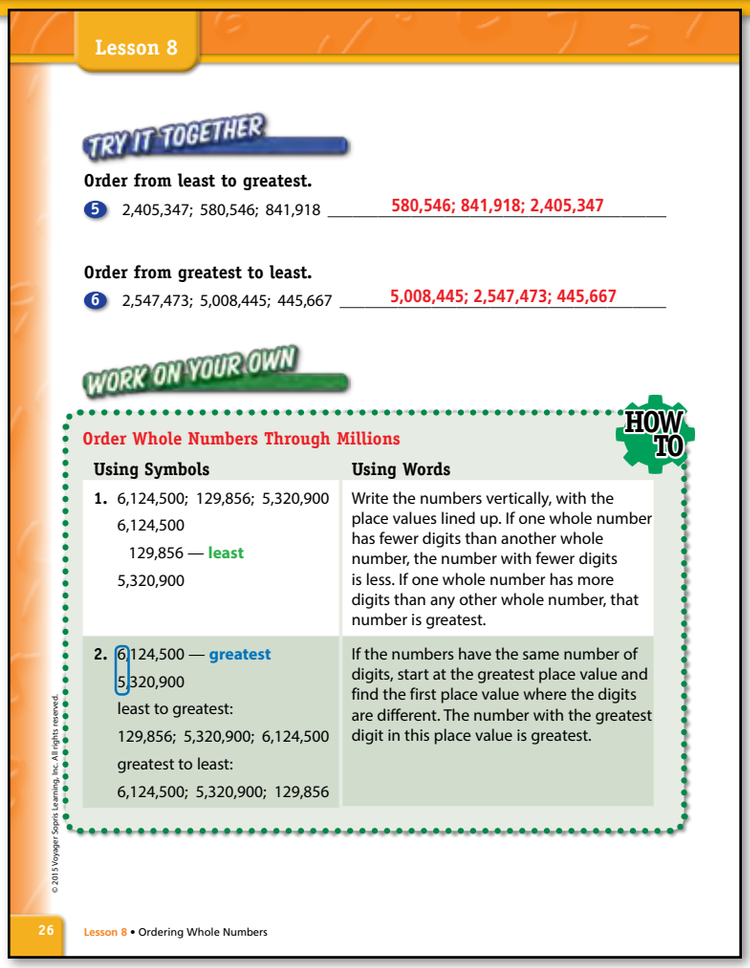
greatest to least: 7,240; 7,233; 7,221; 7,210

Write that number on the middle line and cross it off in the table. What number is left? (9,010,040) **The number 9,010,040 is the least of the three numbers. Write that number on the line labeled *least*. The numbers are now ordered from least to greatest.**

Problem 3

Notice that some of the numbers in this problem have a different number of digits. Remember, to compare whole numbers with a different number of digits, the whole number with the most digits is the greatest number.

Begin by writing the four numbers vertically, making sure to line up the correct place values. At what place value do the numbers first differ? (millions) **What are the different digits?** (3 and 4) **Which digit is greater?** (4) **Then which number is the greatest number?** (4,015,955) **Cross off that number in the table and write it on the line labeled *greatest*. What is known about the remaining three numbers?** (Now 3,889,171 is the greatest number.) **Write 3,889,171 on the line next to the greatest number and cross off that number in the table. Two numbers are left in the table. Continue the pattern of looking for the whole number with the most digits.**


Lesson 8

TRY IT TOGETHER

Order from least to greatest.

5 2,405,347; 580,546; 841,918 580,546; 841,918; 2,405,347

Order from greatest to least.

6 2,547,473; 5,008,445; 445,667 5,008,445; 2,547,473; 445,667

WORK ON YOUR OWN

HOW TO

Order Whole Numbers Through Millions

Using Symbols	Using Words
1. 6,124,500; 129,856; 5,320,900 6,124,500 129,856 — least 5,320,900	Write the numbers vertically, with the place values lined up. If one whole number has fewer digits than another whole number, the number with fewer digits is less. If one whole number has more digits than any other whole number, that number is greatest.
2. 6,124,500 — greatest 5,320,900 least to greatest: 129,856; 5,320,900; 6,124,500 greatest to least: 6,124,500; 5,320,900; 129,856	If the numbers have the same number of digits, start at the greatest place value and find the first place value where the digits are different. The number with the greatest digit in this place value is greatest.

26 Lesson 8 • Ordering Whole Numbers

Which number is greater? (630,912) **Why?** (It has more digits.) **Write 630,912 on the next line and cross it off in the table. Write the last number, 81,097, on the line labeled *least*. The numbers are now ordered from greatest to least.**

Problem 4

What is the first step to comparing and ordering numbers? (Write the numbers vertically, lining up the digits using the correct place values.) **What is the greatest place value in all the numbers?** (millions) **At what place value do the digits differ in the numbers?** (hundred thousands) **What are the different digits?** (6, 6, 3) **Which digit is less, 6 or 3?** (3) **Which number is least?** (9,373,456) **Cross off that number in the table. Write 9,373,456 on the line labeled *least*.**

Because the greatest digits are the same, look at the next place value where just those two numbers differ. They differ at the ten thousands place. The first number has a 3 and the second number has a 6. Which digit is greater? (6) **Which number is greater?** (9,668,201) **Write 9,668,201 on the line labeled *greatest* and cross it off in the table. The number left is the middle number. Write 9,637,142 on the middle line. The numbers are now ordered from greatest to least.**

BUILD THE CONCEPT

Model how to order whole numbers using a number line.

A number line can be used to order a set of numbers either from least to greatest or from greatest to least. Numbers increase from left to right on a number line and decrease from right to left on a number line.

To order numbers on a number line, first graph each number from the set. Place points on the graph for 7,233; 7,221; 7,240; and 7,210 and write each number above the line.

To order numbers from least to greatest, write the numbers as they appear on the number line from left to right. What are the numbers in order from left to right, or least to greatest? (7,210; 7,221; 7,233; 7,240) **To order numbers from greatest to least, write the numbers as they appear on the number line from right to left. What are the numbers in order from right to left, or greatest to least?** (7,240; 7,233; 7,221; 7,210)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

Write the numbers vertically, lining up place values. Which number is the greatest? (2,405,347) **Why?** (It has the most digits.) **What is the next step?** (Compare the greatest place value of the remaining numbers.) **What is the greatest place value in the remaining numbers?** (hundred thousands) **What are the digits in the hundred thousands place?** (5 and 8) **Which digit is less?** (5) **Which number is the least?** (580,546) **What are the numbers in order from least to greatest?** (580,546; 841,918; 2,405,347)

Problem 6

What is the first step in ordering these numbers? (Rewrite them vertically.) **Which number is the least?** (445,667) **Why?** (It has the fewest digits.) **What are the numbers in order from greatest to least?** (5,008,445; 2,547,473; 445,667)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING

This problem illustrates the **Using Logical Reasoning** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem by reasoning logically. The instruction is immediately followed by application of the strategy in problem 13.

Have students read the problem.

Ask students to write the four scores in order from least to greatest.

Notice that Mary's score is the least and that Martin's score is the greatest.

Now have students read the problem again.

The pertinent information is that Janet's score is less than Greg's.

Have students write "Janet" after "Mary" and "Greg" after "Janet."

Janet scored 1,500 points and Greg scored 2,200 points.

Problems 7–15

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

SKILL BUILDING: NEW AND REVIEW

Order from least to greatest.

7. 1,834,374; 7,425,741; 4,255,218 **1,834,374; 4,255,218; 7,425,741**
8. 3,256,273; 3,229,245; 6,245,217 **3,229,245; 3,256,273; 6,245,217**

Order from greatest to least.

9. 5,835,282; 6,835,282; 5,235,382 **6,835,282; 5,835,282; 5,235,382**
10. 981,337; 3,891,373; 189,773; 7,891,737 **7,891,737; 3,891,373; 981,337; 189,773**

Compare. Write >, <, or =.

11. 3,043,403 < 6,008,006
12. 3,156,912 > 3,154,839

PROBLEM-SOLVING

Using Logical Reasoning

Janet, Martin, Greg, and Mary played a video game. Their final scores were 1,100, 1,500, 2,200, and 2,500. Janet's score is less than Greg's but greater than Mary's. Martin has the greatest score, and Mary has the least score. Who scored 2,200 points?

a. **Find:** who scored 2,200 points

b. **How?** Use logical reasoning.

c. **Solve.**

least			greatest
Mary,	Janet,	Greg,	Martin
↓	↓	↓	↓
1,100,	1,500,	2,200,	2,500

Greg scored 2,200 points.

d. **Is the answer reasonable? Explain.** Yes, the answer is reasonable because Greg's score is neither the greatest nor the least and Greg's score is greater than Janet's.

CHECK UP

ASSESS INFORMALLY

Error Analysis

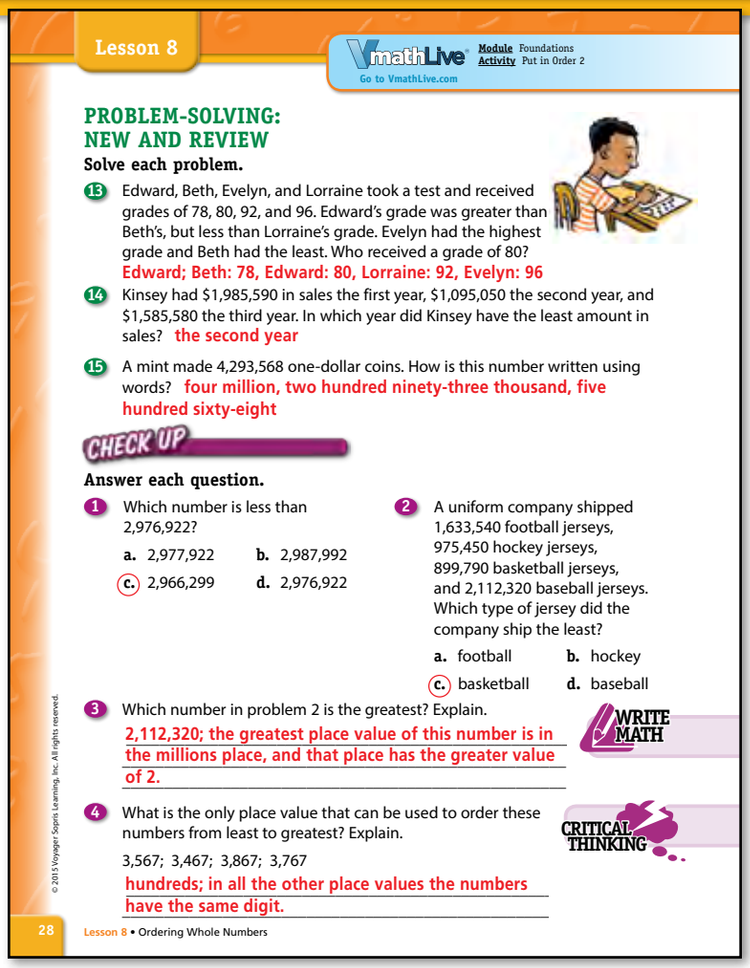
Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a,1b, 1d, or 2b: The student confused the concepts of less than, greater than, and equal to. Use Additional Resources in E.1.7 to review how to compare whole numbers.

If student answered 2a or 2d: The student did not understand that whole numbers with fewer digits are the lesser numbers. Point out that 1,633,540 and 2,112,320 have more digits than 975,450 and 899,790, so they cannot be the lesser numbers.

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student that the greatest number has the greatest number of digits and the larger digit in the greatest place value. Use Additional Resources in E.1.8 to reteach how to order whole numbers.



Lesson 8

VmathLive Module Foundations Activity Put in Order 2 Go to VmathLive.com

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

13 Edward, Beth, Evelyn, and Lorraine took a test and received grades of 78, 80, 92, and 96. Edward's grade was greater than Beth's, but less than Lorraine's grade. Evelyn had the highest grade and Beth had the least. Who received a grade of 80?
Edward; Beth: 78, Edward: 80, Lorraine: 92, Evelyn: 96

14 Kinsey had $1,985,590 in sales the first year, $1,095,050 the second year, and $1,585,580 the third year. In which year did Kinsey have the least amount in sales? the second year

15 A mint made 4,293,568 one-dollar coins. How is this number written using words? four million, two hundred ninety-three thousand, five hundred sixty-eight

CHECK UP

Answer each question.

1 Which number is less than 2,976,922?

a. 2,977,922 b. 2,987,992
c. 2,966,299 d. 2,976,922

2 A uniform company shipped 1,633,540 football jerseys, 975,450 hockey jerseys, 899,790 basketball jerseys, and 2,112,320 baseball jerseys. Which type of jersey did the company ship the least?

a. football b. hockey
c. basketball d. baseball

3 Which number in problem 2 is the greatest? Explain.
2,112,320; the greatest place value of this number is in the millions place, and that place has the greater value of 2.

WRITE MATH

4 What is the only place value that can be used to order these numbers from least to greatest? Explain.
3,567; 3,467; 3,867; 3,767
hundreds; in all the other place values the numbers have the same digit.

CRITICAL THINKING

28 Lesson 8 • Ordering Whole Numbers

DIFFERENTIATION

Additional Resources

VmathLive
Module: Foundations
Activity: Put in Order 2

Vmath Reteach
Reteach Student Book Module 1 Lesson 8
Reteach Teacher Edition Module 1 Lesson 8

Extra Practice
Student Book page 37

English Language Learners

Use the VmathLive Animated Glossary to review the term *order*. Demonstrate the vocabulary at the beginning of the lesson as students gather around the computer screen or through a projection system if possible.

To help students understand how to order numbers, explain that ordering numbers from least to greatest or greatest to least is a way to organize the numbers. Have students use lesser numbers to model this process. Write 456, 465, and 399 on sticky notes or index cards. Tell students that they need to order, or organize, the numbers from least to greatest. Now ask students to reorder, or reorganize, the numbers from greatest to least.

Students with Special Needs

For students having difficulty with the added step of ordering numbers, help them break down the process of comparing and ordering. Write the numbers 7,654,350; 7,679,000; and 6,999,999 horizontally on the board. Have students write these numbers vertically on centimeter grid paper. Tell students they will order the numbers from greatest to least. Have students look at the greatest place value and compare the numbers. Once students identify that the 6 in 6,999,999 is less than the 7 in the millions place of the other numbers, have students put a 3 with a circle around it to the right of that number. This will help students remember that 6,999,999 is the third greatest number, or the least number.

Now have students follow the same process for the remaining two numbers and put a 1 with a circle around it to the right of the greatest number. The remaining number should be marked with a 2. Then students can write the numbers out in order from greatest to least. Repeat this process with other sets of numbers.

Gizmos Guided Discovery

Lesson 9

Objective

To derive the rules for rounding to the nearest hundred

WITH CONCEPTUAL DEVELOPMENT TECHNOLOGY

Materials

- Gizmo: Rounding Whole Numbers (Number Line)

Gizmos Log In Instructions

- Log in to vmath.voyagersopris.com using your Username and Password provided in VPORT®.
- Select the Gizmos poster.
- Click on the Rounding Whole Numbers (Number Line) Gizmo link.

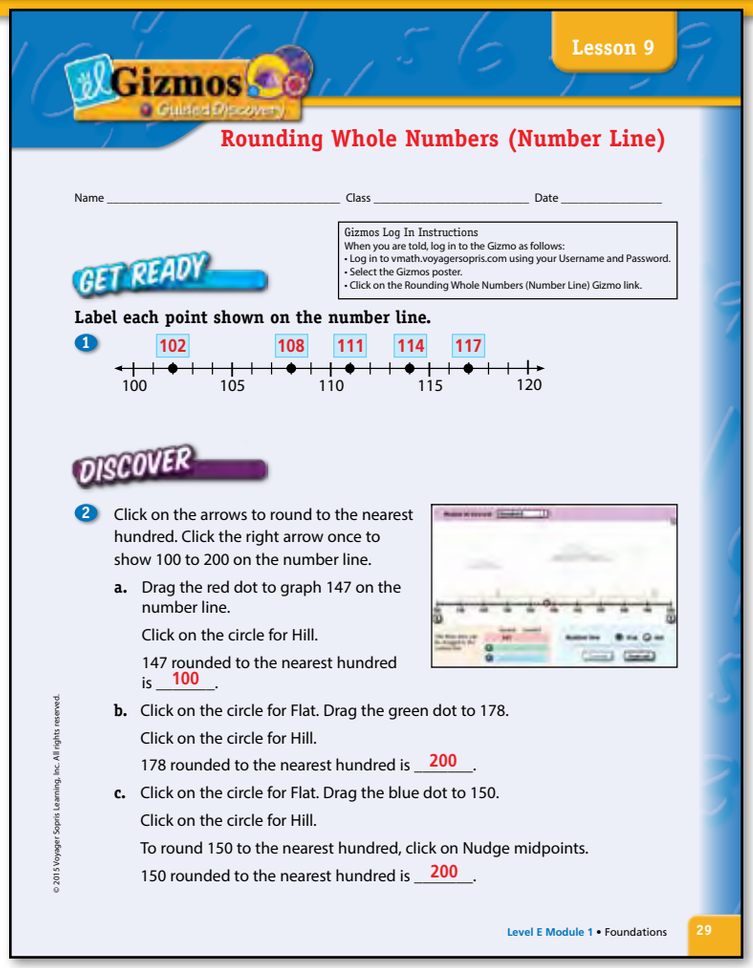
Lesson Notes

Before beginning the lesson, be sure students have their Student Books and are ready to work at the computers.

Complete problem 1 before students log in to the Rounding Whole Numbers (Number Line) Gizmo.

Once Hundred is selected, note that the number line moves by hundreds when the arrows are clicked to move right or left along the number line.

If students have additional time, have them answer Assessment Questions 1–5 in the Gizmo. They can click on the Check Your Answers button to see how well they did on the assessment.



Gizmos Guided Discovery — Lesson 9

Rounding Whole Numbers (Number Line)

Name _____ Class _____ Date _____

Gizmos Log In Instructions
When you are told, log in to the Gizmo as follows:
• Log in to vmath.voyagersopris.com using your Username and Password.
• Select the Gizmos poster.
• Click on the Rounding Whole Numbers (Number Line) Gizmo link.

GET READY

Label each point shown on the number line.

1 102 108 111 114 117

100 105 110 115 120

DISCOVER

2 Click on the arrows to round to the nearest hundred. Click the right arrow once to show 100 to 200 on the number line.

a. Drag the red dot to graph 147 on the number line.
Click on the circle for Hill.
147 rounded to the nearest hundred is 100.

b. Click on the circle for Flat. Drag the green dot to 178.
Click on the circle for Hill.
178 rounded to the nearest hundred is 200.

c. Click on the circle for Flat. Drag the blue dot to 150.
Click on the circle for Hill.
To round 150 to the nearest hundred, click on Nudge midpoints.
150 rounded to the nearest hundred is 200.

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GET READY

Problem 1

A number line can be used to locate numbers. What range of numbers is shown on the number line? (100 through 120) **Where on the number line is the first point located?** (102) **How do you know?** (Count 2 tick marks from 100 to reach the point at 102.)

Where on the number line is the second point located? (108) **How do you know?** (Count 3 tick marks from 105 to reach the point at 108.) **Where on the number line is the third point located?** (111) **How do you know?** (Count 1 tick mark from 110 to reach the point at 111.)

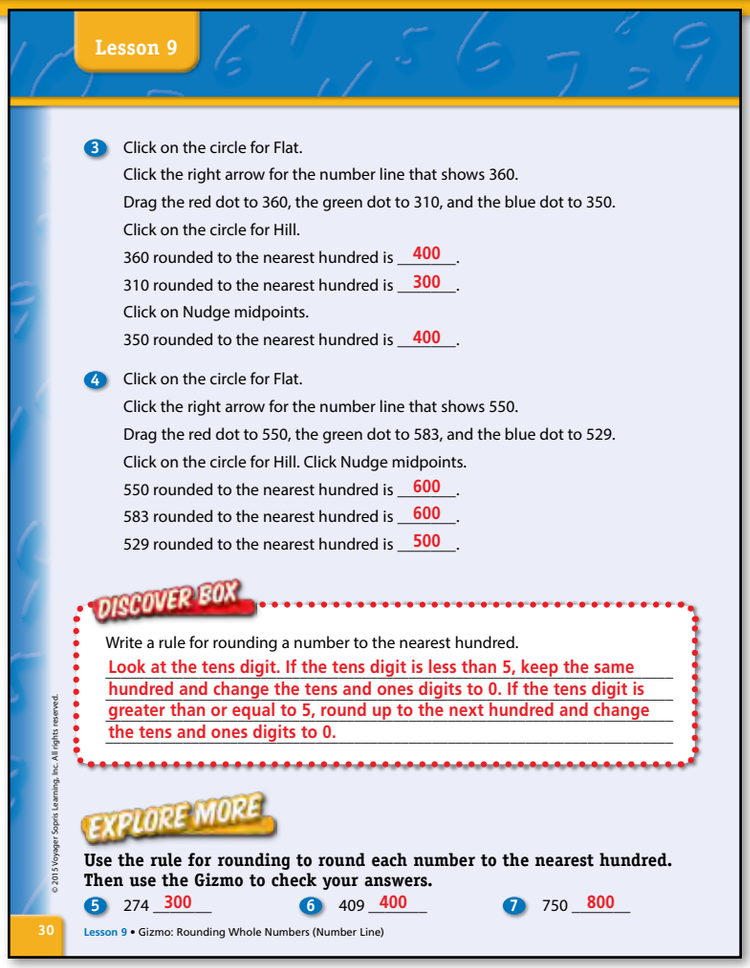
Where on the number line is the fourth point located? (114) **Where on the number line is the last point located?** (117)

DISCOVER

Have students log in to the Rounding Whole Numbers (Number Line) Gizmo using the instructions in the box. Orient students to the Gizmo by reading aloud the description: **Place points on a number line. Round these values to the nearest hundred. Visualize rounding by showing the number line as a hill. This hill causes the points to roll to the nearest valley (nearest hundred).**

Problem 2

Click on the arrows at the top next to Round to nearest to select Hundred. To change the number line so the numbers from 100 to 200 show, click the right arrow on the number line once. To graph a point at 147 on the number line, drag the red dot to 147.


Lesson 9

3 Click on the circle for Flat.
Click the right arrow for the number line that shows 360.
Drag the red dot to 360, the green dot to 310, and the blue dot to 350.
Click on the circle for Hill.
360 rounded to the nearest hundred is 400.
310 rounded to the nearest hundred is 300.
Click on Nudge midpoints.
350 rounded to the nearest hundred is 400.

4 Click on the circle for Flat.
Click the right arrow for the number line that shows 550.
Drag the red dot to 550, the green dot to 583, and the blue dot to 529.
Click on the circle for Hill. Click Nudge midpoints.
550 rounded to the nearest hundred is 600.
583 rounded to the nearest hundred is 600.
529 rounded to the nearest hundred is 500.

DISCOVER BOX

Write a rule for rounding a number to the nearest hundred.
Look at the tens digit. If the tens digit is less than 5, keep the same hundred and change the tens and ones digits to 0. If the tens digit is greater than or equal to 5, round up to the next hundred and change the tens and ones digits to 0.

EXPLORE MORE

Use the rule for rounding to round each number to the nearest hundred. Then use the Gizmo to check your answers.
5 274 300 6 409 400 7 750 800

30 Lesson 9 • Gizmo: Rounding Whole Numbers (Number Line)

To round 147 to the nearest hundred, click on the Number line circle for Hill. What happens to the red dot? (It rolls down to 100.) **What is 147 rounded to the nearest hundred?** (100) **The hill shows how to use the number line to round 147 to the nearest hundred. Where is the top of the hill?** (150) **What will happen to points between 100 and 150 on the number line hill?** (They will roll down to 100.)

Click on the circle for Flat to return to a flat number line. To graph a point at 178, drag the green dot to 178. To round 178 to the nearest hundred, click on the circle for Hill. What happens to the green dot? (It rolls down to 200.) **What is 178 rounded to the nearest hundred?** (200) **The hill shows how to use the number line to round 178 to the nearest hundred. Where is the top of the hill?** (150) **What will happen to points between 150 and 200 on the number line hill?** (They will roll down to 200.)

Click on the circle for Flat to return to a flat number line. Drag the blue dot to graph 150 on the number line. Click on the circle for Hill. What happens to the blue dot? (It stays at the top of the hill at 150.) **To round 150 to the nearest hundred, click on Nudge midpoints in the top right corner of the screen. What is 150 rounded to the nearest hundred?** (200)

Problem 3

Click on the circle for Flat. Find the number line that shows 360. Between which two hundreds is 360? (300 and 400) **Drag the red dot to 360. Drag the green dot to 310. Then drag the blue dot to 350. Click on the circle for Hill to see how to round each number to the nearest hundred. What is 360 rounded to the nearest hundred?** (400) **What is 310 rounded to the nearest hundred?** (300) **What happens to the point for 350 on the hill?** (It stays at the top of the hill.) **To round 350 to the nearest hundred, click on Nudge midpoints. What is 350 rounded to the nearest hundred?** (400)

Problem 4

Click on the circle for Flat. Find the number line that shows 550. Between which two hundreds is 550? (500 and 600) **Drag the red dot to 550. Drag the green dot to 583. Then drag the blue dot to 529. Click on the circle for Hill. Then click on Nudge midpoints for any points that stay at the top of the hill. What is 550 rounded to the nearest hundred?** (600) **What is 583 rounded to the nearest hundred?** (600) **What is 529 rounded to the nearest hundred?** (500)

DISCOVER BOX

Look at problems 2–4, which you have just completed. What is a rule for rounding a number to the nearest hundred? (Look at the tens digit. If the tens digit is less than 5, keep the same hundred and change the tens and ones digits to zeros. If the tens digit is greater than or equal to 5, round up to the next hundred and change the tens and ones digits to zeros.)

EXPLORE MORE

Problems 5–7

What is 274 rounded to the nearest hundred? (300)
What is 409 rounded to the nearest hundred? (400)
What is 750 rounded to the nearest hundred? (800)

Extension: Have students or partners explore more ways to round numbers using a number line.

Lesson 10

Objective

To round a whole number

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **rounding**
  replacing a number with another number that tells about how many or how much

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

Look at the place value chart. Which digit is in the millions place? (4) **Which digit is in the ten thousands place?** (1) **Which digit is in the thousands place?** (6) **Which digit is in the hundreds place?** (7)

MODEL NEW SKILLS

Problem 2

Sometimes an approximate value for a number is useful. Finding an approximate value for a number is called rounding. Numbers can be rounded to different place values.

Locating place values is important when rounding numbers. To round the number 7,629 to the nearest thousand, first find the digit in the thousands place. Which digit is in the thousands place? (7) **The 7 has been underlined to show it is the digit in the place value being rounded. Next, look at the digit to the right of that place. What digit is to the right of the 7?** (6) **Draw a ring around the 6.**

Rounding rules state that if the digit to the right of the place value being rounded is greater than or equal to 5, round up. If the digit to the right of the place value being rounded is less than 5, keep the digit in the place value being rounded the same. Is 6 greater than or equal to 5? (yes) **To round up, add 1 to the digit in the place value being rounded. What is the sum of 7 and 1?** (8) **What is the new value for the thousands place?** (8)

Next, write zeros for all the digits to the right of the rounded digit. How many zeros will be written? (3) **What is 7,629 rounded to the nearest thousand?** (8,000)

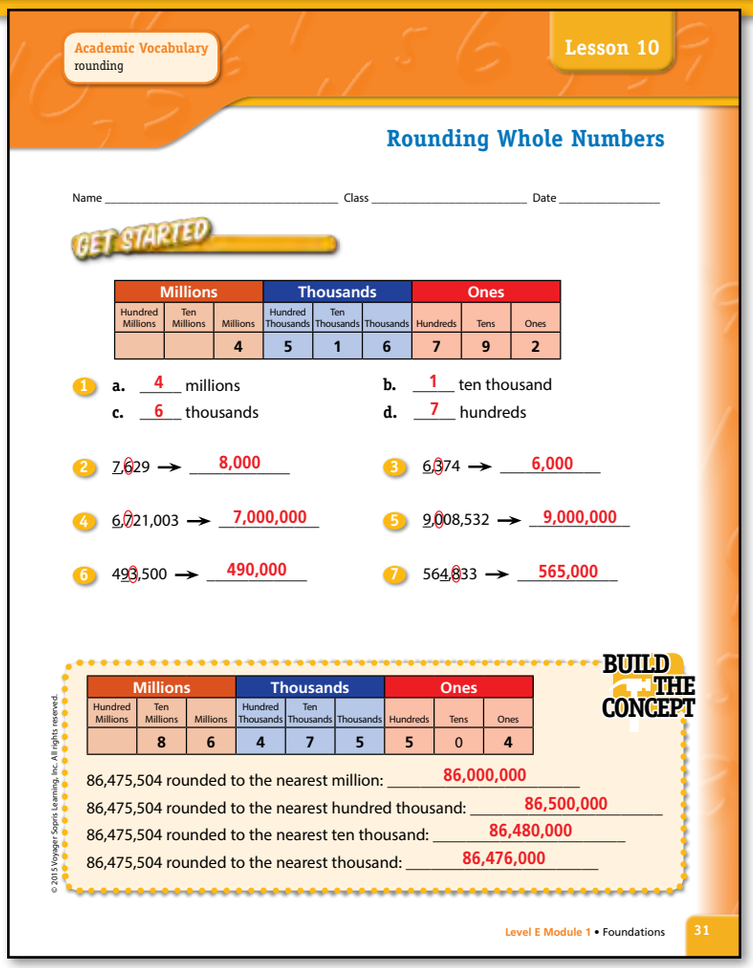
Problem 3

To round 6,374 to the nearest thousand, first find the digit in the thousands place. What digit is in the thousands place? (6) **Look at the next digit to the right. What is that digit?** (3) **Draw a ring around the 3.**

If the digit directly to the right of the digit being rounded is less than 5, keep the digit being rounded the same. Is 3 less than 5? (yes) **Keep the digit in the thousands place the same and write zeros for all the digits to the right of it. What is 6,374 rounded to the nearest thousand?** (6,000)

Problem 4

The number in this problem will be rounded to the nearest million. Which digit is in the millions place? (6) **Which digit is the next digit to the right of the millions place?** (7) **Draw a ring around the 7.**



Academic Vocabulary
rounding

Lesson 10

Rounding Whole Numbers

Name _____ Class _____ Date _____

GET STARTED

Millions			Thousands			Ones		
Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
		4	5	1	6	7	9	2

1 a. 4 millions b. 1 ten thousand
c. 6 thousands d. 7 hundreds

2 7,629 → 8,000

3 6,374 → 6,000

4 6,721,003 → 7,000,000

5 9,008,532 → 9,000,000

6 493,500 → 490,000

7 564,833 → 565,000

BUILD THE CONCEPT

Millions			Thousands			Ones		
Hundred Millions	Ten Millions	Millions	Hundred Thousands	Ten Thousands	Thousands	Hundreds	Tens	Ones
	8	6	4	7	5	5	0	4

86,475,504 rounded to the nearest million: 86,000,000
86,475,504 rounded to the nearest hundred thousand: 86,500,000
86,475,504 rounded to the nearest ten thousand: 86,480,000
86,475,504 rounded to the nearest thousand: 86,476,000

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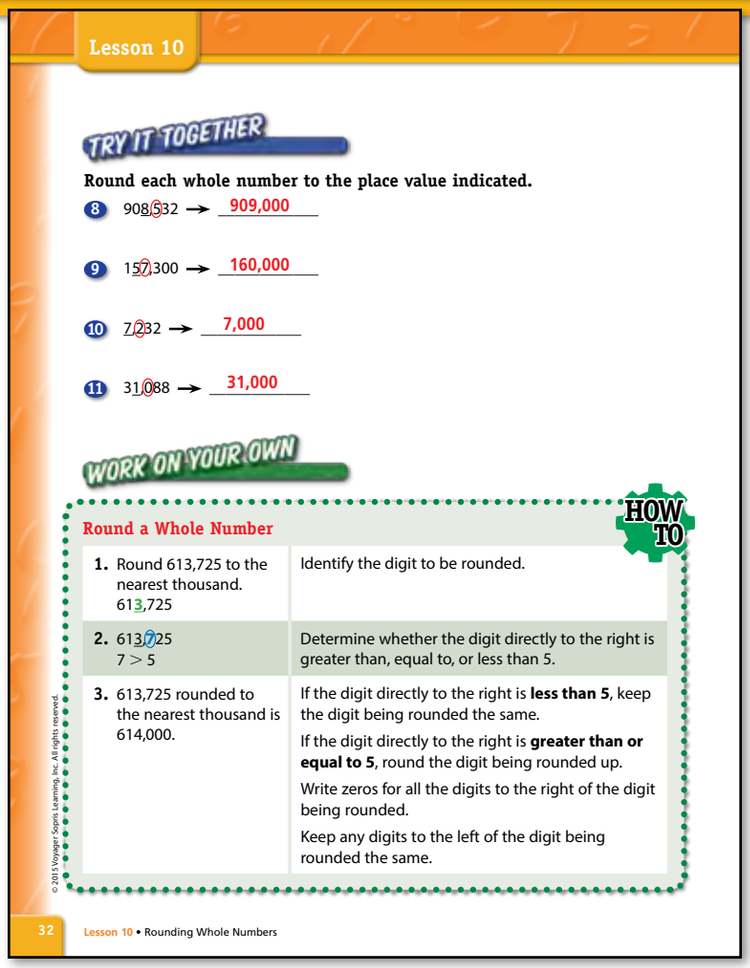

Lesson 10

TRY IT TOGETHER

Round each whole number to the place value indicated.

8 908,532 → 909,000

9 157,300 → 160,000

10 7,232 → 7,000

11 31,088 → 31,000

WORK ON YOUR OWN

HOW TO

Round a Whole Number

1. Round 613,725 to the nearest thousand. 613,725	Identify the digit to be rounded.
2. 613,725 7 > 5	Determine whether the digit directly to the right is greater than, equal to, or less than 5.
3. 613,725 rounded to the nearest thousand is 614,000.	If the digit directly to the right is **less than 5**, keep the digit being rounded the same. If the digit directly to the right is **greater than or equal to 5**, round the digit being rounded up. Write zeros for all the digits to the right of the digit being rounded. Keep any digits to the left of the digit being rounded the same.

32 Lesson 10 • Rounding Whole Numbers

Will the 7 make the 6 round up or stay the same? (round up) **Why?** (Seven is greater than 5.) **What is 6,721,003 rounded to the nearest million?** (7,000,000)

Problem 5

To round the number in this problem to the nearest million, begin by finding the digit in the millions place. Which digit is in the millions place? (9) **What is the digit directly to the right of the 9?** (0) **Draw a ring around the 0.**

Is 0 less than, greater than, or equal to 5? (less than) **Will the digit in the millions place be rounded up or kept the same?** (kept the same) **What is 9,008,532 rounded to the nearest million?** (9,000,000)

Problem 6

A number can be rounded to a place value other than the greatest place value. In this problem, round 493,500 to the place value indicated by the underlined digit. What place value is indicated by the underlined digit? (ten thousands place) **Which digit is in the ten thousands place?** (9) **What digit is directly to the right of that place?** (3) **Draw a ring around the 3.**

Because 3 is less than 5, keep the digit being rounded the same. Keep the digits to the left of the ten thousands place the same. Write zeros in all the places to the right of the ten thousands place. What is 493,500 rounded to the nearest ten thousand? (490,000)

Problem 7

This number will be rounded to the thousands place. Which digit is in the thousands place? (4) **What digit is directly to the right of that place?** (8) **Draw a ring around the 8.**

Will the 8 make the 4 round up or stay the same? (round up) **Why?** (Eight is greater than 5.) **What is 564,833 rounded to the nearest thousand?** (565,000)

BUILD THE CONCEPT

Model how to use a place value chart to round a whole number to different places.

Use the place value chart to help round the number 86,475,504 to different place values. First, round the number to the nearest million. What is 86,475,504 rounded to the nearest million? (86,000,000) **Next, round the number to the nearest hundred thousand. What is 86,475,504 rounded to the nearest hundred thousand?** (86,500,000) **Next, round the number to the nearest ten thousand. What is 86,475,504 rounded to the nearest ten thousand?** (86,480,000) **Finally, round the number to the nearest thousand. What is 86,475,504 rounded to the nearest thousand?** (86,476,000)

Notice that the value of a rounded number can change depending upon which place value it is rounded to.

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 8

This number will be rounded to the thousands place. What is the first step? (Find the digit in the thousands place.) **Which digit is in the thousands place?** (8) **What is the next step?** (Look at the digit directly to the right.) **What is the digit directly to the right?** (5) **Draw a ring around the 5.**

Is 5 greater than, less than, or equal to 5? (equal to 5) **Will the digit be rounded up or kept the same?** (rounded up) **What is the new value for the thousands place value?** (9) **What happens to the digits to the left of the thousands place?** (They stay

the same.) **What happens to the digits to the right of the thousands place?** (They all become 0.) **What is 908,532 rounded to the nearest thousand?** (909,000)

Problem 9

What is the first step in rounding this number? (Find the digit in the ten thousands place.) **Which digit is in the ten thousands place?** (5) **What is the next step?** (Look at the digit directly to the right.) **What is the digit directly to the right?** (7) **Draw a ring around the 7.**

Will the digit in the ten thousands place be rounded up or kept the same? (rounded up) **What is 157,300 rounded to the nearest ten thousand?** (160,000)

Problem 10

To which place value will this number be rounded? (thousands place) **What is 7,232 rounded to the nearest thousand?** (7,000)

Problem 11

To which place value will this number be rounded? (thousands place) **What is 31,088 rounded to the nearest thousand?** (31,000)

MONITOR INDEPENDENT WORK

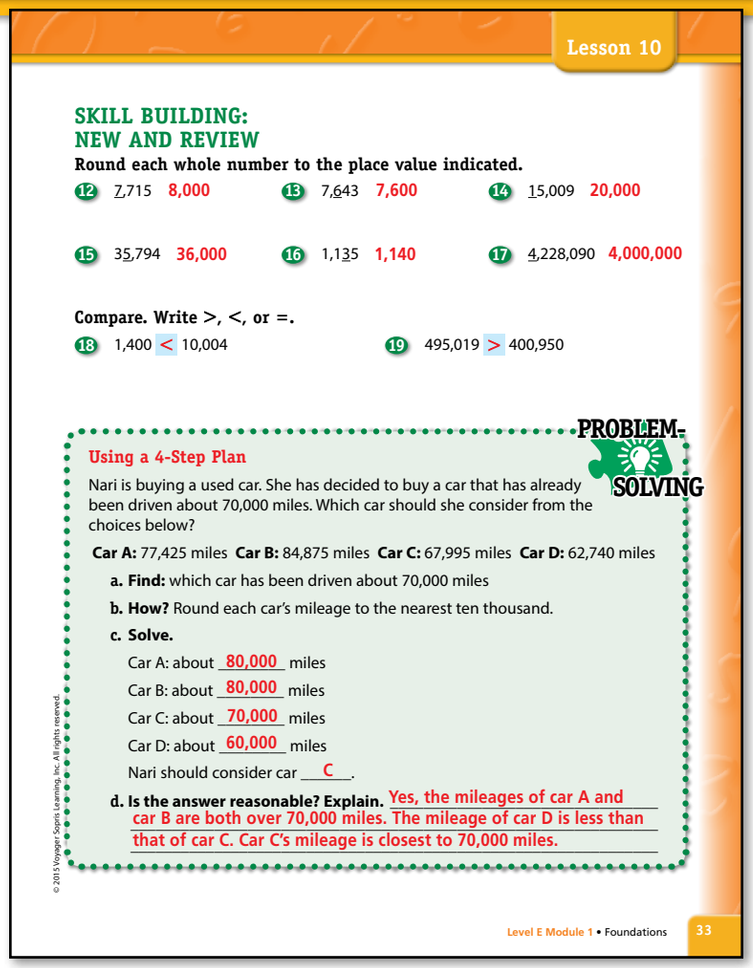
HOW TO Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING This problem illustrates the **Using a 4-Step Plan** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem involving rounding numbers. The instruction is immediately followed by application of the strategy in problem 20.

The problem states that Nari wants to buy a car that has been driven about 70,000 miles.

Have students read the mileage for each car Nari is considering.

Ask students to which place they should round the mileage for each car. They should round to the ten-thousands place.



Lesson 10

SKILL BUILDING: NEW AND REVIEW

Round each whole number to the place value indicated.

12 7,715 8,000 13 7,643 7,600 14 15,009 20,000

15 35,794 36,000 16 1,135 1,140 17 4,228,090 4,000,000

Compare. Write >, <, or =.

18 1,400 < 10,004 19 495,019 > 400,950

PROBLEM-SOLVING

Using a 4-Step Plan

Nari is buying a used car. She has decided to buy a car that has already been driven about 70,000 miles. Which car should she consider from the choices below?

Car A: 77,425 miles **Car B:** 84,875 miles **Car C:** 67,995 miles **Car D:** 62,740 miles

a. Find: which car has been driven about 70,000 miles

b. How? Round each car's mileage to the nearest ten thousand.

c. Solve.

Car A: about 80,000 miles

Car B: about 80,000 miles

Car C: about 70,000 miles

Car D: about 60,000 miles

Nari should consider car C.

d. Is the answer reasonable? Explain. Yes, the mileages of car A and car B are both over 70,000 miles. The mileage of car D is less than that of car C. Car C's mileage is closest to 70,000 miles.

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Next, ask students to round each number to the ten-thousands place.

Have students review what the problem wanted them to find.

Ask students which car has been driven about 70,000 miles.

Have students explain why Car C is a reasonable answer for the problem.

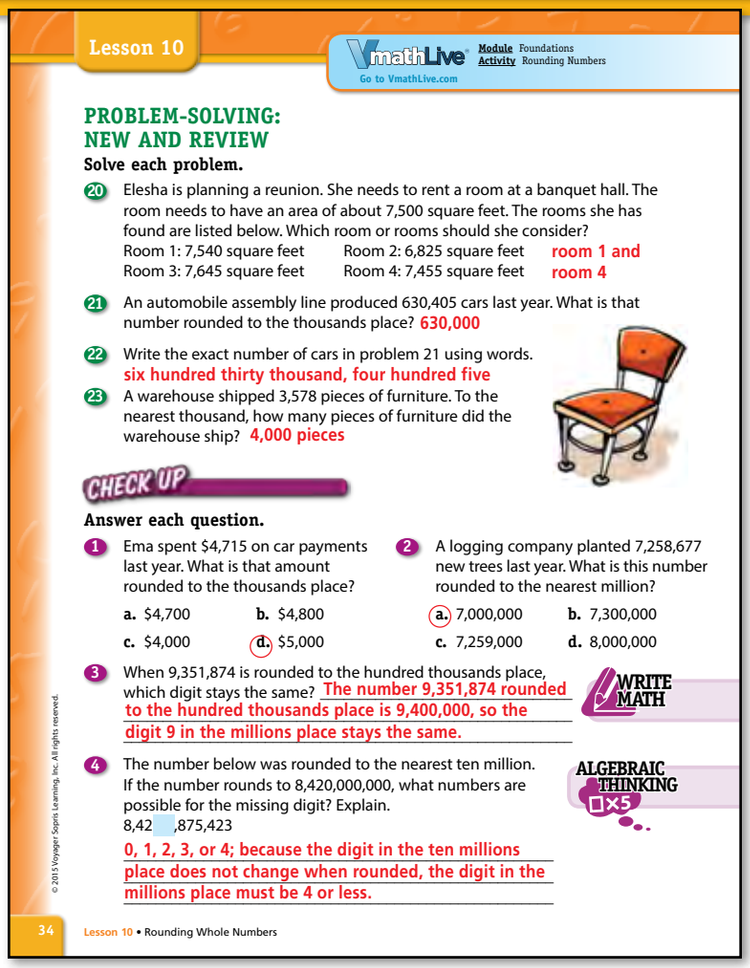
Problems 12–23

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.



Lesson 10

VmathLive Module Foundations Activity Rounding Numbers
Go to VmathLive.com

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

20 Elesha is planning a reunion. She needs to rent a room at a banquet hall. The room needs to have an area of about 7,500 square feet. The rooms she has found are listed below. Which room or rooms should she consider?
Room 1: 7,540 square feet Room 2: 6,825 square feet **room 1 and**
Room 3: 7,645 square feet Room 4: 7,455 square feet **room 4**

21 An automobile assembly line produced 630,405 cars last year. What is that number rounded to the thousands place? **630,000**

22 Write the exact number of cars in problem 21 using words.
six hundred thirty thousand, four hundred five

23 A warehouse shipped 3,578 pieces of furniture. To the nearest thousand, how many pieces of furniture did the warehouse ship? **4,000 pieces**

CHECK UP

Answer each question.

1 Ema spent $4,715 on car payments last year. What is that amount rounded to the thousands place?
a. $4,700 b. $4,800
(d.) $5,000 c. $4,000

2 A logging company planted 7,258,677 new trees last year. What is this number rounded to the nearest million?
(a.) 7,000,000 b. 7,300,000
c. 7,259,000 d. 8,000,000

3 When 9,351,874 is rounded to the hundred thousands place, which digit stays the same? **The number 9,351,874 rounded to the hundred thousands place is 9,400,000, so the digit 9 in the millions place stays the same.**

WRITE MATH

4 The number below was rounded to the nearest ten million. If the number rounds to 8,420,000,000, what numbers are possible for the missing digit? Explain.
8,42 ,875,423
0, 1, 2, 3, or 4; because the digit in the ten millions place does not change when rounded, the digit in the millions place must be 4 or less.

ALGEBRAIC THINKING

If student answered 1a or 2b: The student did not round to the correct place value, but rounded to the place value to the right instead. Use Additional Resources in E.1.10 to reteach how to round whole numbers.

If student answered 1c or 2d: The student rounded incorrectly. Use Additional Resources in E.1.10 to reteach how to round whole numbers.

WRITE MATH

If student answered problem 3 incorrectly: While students work together, be sure the student understands that the digits to the left of the place value being rounded stay the same.

Technology

Have students use an online search engine to discover other ways to apply rounding in real-life situations. Additional digital content is available through this feature in the eBook.

DIFFERENTIATION

Additional Resources

VmathLive

VmathLive
Module: Foundations
Activity: Rounding Numbers

Vmath Reteach
Reteach Student Book Module 1 Lesson 10
Reteach Teacher Edition Module 1 Lesson 10

Extra Practice
Student Book page 38

English Language Learners

Point out to students that rounded numbers end with zeros. Discuss that the digit 0 has a round shape. Students can use this strategy to remember to add zeros, or the round digit, after the digit in the place value they rounded. Ask students to round 9,087,642 to the nearest hundred thousand. Have students compare the number of zeros in their rounded number with another student.

Students with Special Needs

Write 6,839,845 on the board. Underline the 6 and ask students what place value they will round to. When students say the millions place, ask them what number they will use to help them determine how to round. After students say the 8 in the hundred thousands place, circle the 8. Tell students that it is the circled digit that determines whether the underlined digit will round up or stay the same. Have a student explain what happens to the 6 in the millions place and what happens to the other digits. The 6 should round up to 7 million, and the remaining digits change to zeros. Repeat the activity with other numbers through millions.

Extra Practice Answer Key

Extra Practice

Name _____ Class _____ Date _____

Lesson 1 Place Value

Give the place value and value of each green digit.

1. 265
   tens; 60
2. 1,057
   ones; 7
3. 448
   hundreds; 400
4. 1,925
   thousands; 1,000
5. 644
   hundreds; 600
6. 4,785
   tens; 80
7. 258
   ones; 8
8. 2,647
   thousands; 2,000
9. 1,065
   hundreds; 0
10. 516
    hundreds; 500
11. 2,673
    tens; 70
12. 29
    ones; 9

Lesson 2 Place Value and Expanded Notation

Write each number in expanded notation.

1. 813
   800 + 10 + 3
2. 103,957
   100,000 + 3,000 + 900 + 50 + 7
3. 9,090
   9,000 + 90
4. 1,800,045,176
   1,000,000,000 + 800,000,000 + 40,000 + 5,000 + 100 + 70 + 6
5. 33,800
   30,000 + 3,000 + 800
6. 1,060,740,501
   1,000,000,000 + 60,000,000 + 700,000 + 40,000 + 500 + 1

Extra Practice

Name _____ Class _____ Date _____

Lesson 3 Writing Whole Numbers Using Words

Write each number using words.

1. 29,820
   twenty-nine thousand, eight hundred twenty
2. 5,007,600
   five million, seven thousand, six hundred
3. 1,390,100,080
   one billion, three hundred ninety million, one hundred thousand, eighty
4. 9,000,512
   nine million, five hundred twelve
5. 103,061
   one hundred three thousand, sixty-one
6. 7,503,433
   seven million, five hundred three thousand, four hundred thirty-three

Lesson 4 Writing Whole Numbers Using Digits

Write each number using digits.

1. thirty-eight thousand, five hundred twenty-two
   38,522
2. three million, six thousand, three hundred
   3,006,300
3. one billion, ninety million, three thousand, fifteen
   1,090,003,015
4. seven million, four hundred twelve thousand, two
   7,412,002
5. two million, nine hundred three thousand, sixty-four
   2,903,064
6. six hundred nineteen thousand, five hundred eight
   619,508

Extra Practice

Name _____ Class _____ Date _____

Lesson 7 Comparing Whole Numbers

Compare. Write >, <, or =.

1. 897,562 > 622,003
2. 4,500,892 < 4,500,893
3. 2,000,345 < 3,000,345
4. 2,745,239 = 2,745,239
5. 741,741 < 7,742,792
6. 22,222 > 22,221
7. 2,659,001 > 2,659,000
8. 689,450 = 689,450

Lesson 8 Ordering Whole Numbers

Order from least to greatest.

1. 65,598; 69,856; 62,456
   62,456; 65,598; 69,856
2. 2,262,350; 2,869,520; 2,657,400
   2,262,350; 2,657,400; 2,869,520
3. 3,200,301; 4,400,890; 33,216
   33,216; 3,200,301; 4,400,890

Order from greatest to least.

4. 5,456,123; 55,111; 147,450
   5,456,123; 147,450; 55,111
5. 7,001,001; 6,001,001; 8,001,001
   8,001,001; 7,001,001; 6,001,001
6. 685,625; 6,856,250; 4,854,142
   6,856,250; 4,854,142; 685,625

Extra Practice

Name _____ Class _____ Date _____

Lesson 10 Rounding Whole Numbers

Round each whole number to the place value indicated.

1. 4,512,600
   4,513,000
2. 5,496
   5,500
3. 9,856,321
   9,900,000
4. 7,564,000
   8,000,000
5. 4,582
   4,580
6. 593
   590
7. 9,450
   9,000
8. 8,756,158
   8,760,000
9. 65,485
   65,500
10. 14,350
    10,000
11. 120,526
    120,500
12. 561,489
    561,490
13. 1,879,456
    1,900,000
14. 5,005,642
    5,000,000
15. 456
    500

Glossary

billions period
the period to the left of the millions period, containing the billions place, the ten billions place, and the hundred billions place

digit
any one of these 10 numerals: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9

expanded notation
a form of notation in which a number is written as the sum of the values of its digits

inequality
a sentence that contains the symbols $>$ (greater than) or $<$ (less than)

millions period
the period to the left of the thousands period, containing the millions place, the ten millions place, and the hundred millions place

period
each group of three digits separated by a comma in a multi-digit number

place value
location of a digit in a number; helps determine the value of a digit

rounding
replacing a number with another number that tells about how many or how much

thousands period
the period to the left of the ones period, containing the thousands place, the ten thousands place, and the hundred thousands place

value
an amount given to a digit based on the digit and the digit's place value

Operations with Whole Numbers: Addition and Subtraction

Table of Contents

Lesson PL1

Objective

To understand the relationship between subtraction and addition

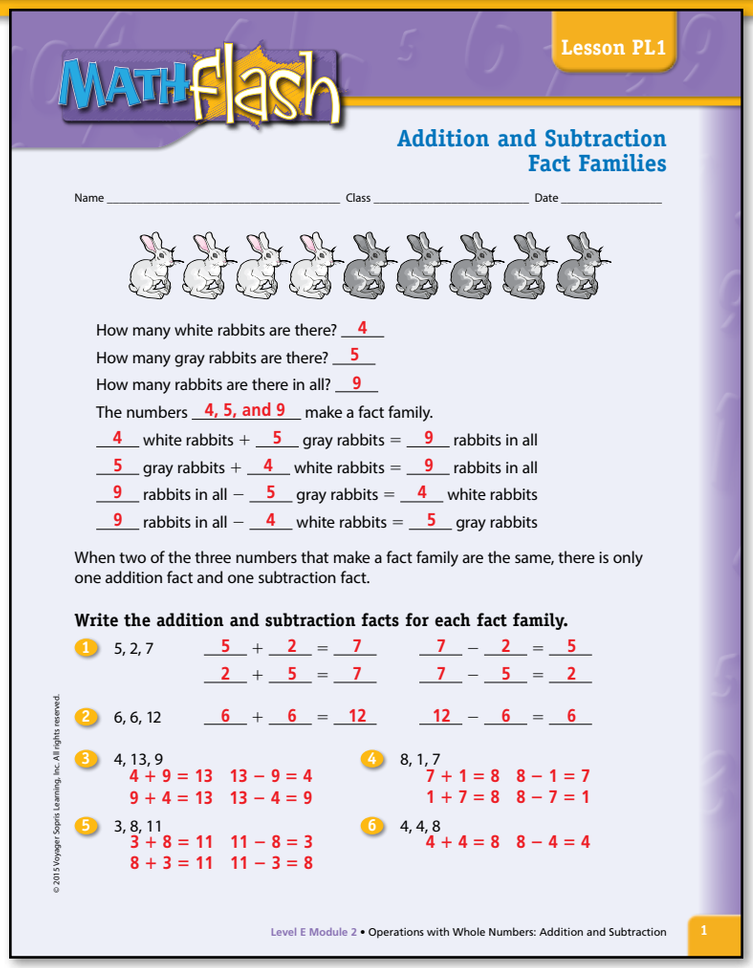
Model the following skill for students.

How many white rabbits are there? (4) **How many gray rabbits are there?** (5) **How many rabbits are there in all?** (9) **The numbers 4, 5, and 9 make the numbers in a fact family. What is the sum of 4 white rabbits and 5 gray rabbits?** (9 rabbits in all)

This problem is the addition fact 4 + 5 = 9. What is the sum of 5 gray rabbits and 4 white rabbits? (9 rabbits) **What is the other addition fact in the fact family?** (5 + 4 = 9) **The greatest number is the sum.**

The greatest number is the first number in each subtraction fact in the fact family. What is the greatest number and the sum of both addition facts? (9) **Nine is the first number in the subtraction facts. What is 9 rabbits in all minus 5 gray rabbits?** (4 white rabbits) **What is the other subtraction fact?** (9 – 4 = 5)

The four facts make a fact family. Not all fact families have four facts. When two of the three numbers that make a fact family are the same, there is only one addition fact and one subtraction fact.



MATH Flash

Lesson PL1

Addition and Subtraction Fact Families

Name _____ Class _____ Date _____

How many white rabbits are there? 4

How many gray rabbits are there? 5

How many rabbits are there in all? 9

The numbers 4, 5, and 9 make a fact family.

4 white rabbits + 5 gray rabbits = 9 rabbits in all

5 gray rabbits + 4 white rabbits = 9 rabbits in all

9 rabbits in all − 5 gray rabbits = 4 white rabbits

9 rabbits in all − 4 white rabbits = 5 gray rabbits

When two of the three numbers that make a fact family are the same, there is only one addition fact and one subtraction fact.

Write the addition and subtraction facts for each fact family.

1. 5, 2, 7
   5 + 2 = 7 7 − 2 = 5
   2 + 5 = 7 7 − 5 = 2
2. 6, 6, 12
   6 + 6 = 12 12 − 6 = 6
3. 4, 13, 9
   4 + 9 = 13 13 − 9 = 4
   9 + 4 = 13 13 − 4 = 9
4. 8, 1, 7
   7 + 1 = 8 8 − 1 = 7
   1 + 7 = 8 8 − 7 = 1
5. 3, 8, 11
   3 + 8 = 11 11 − 8 = 3
   8 + 3 = 11 11 − 3 = 8
6. 4, 4, 8
   4 + 4 = 8 8 − 4 = 4

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 1

Lesson PL2

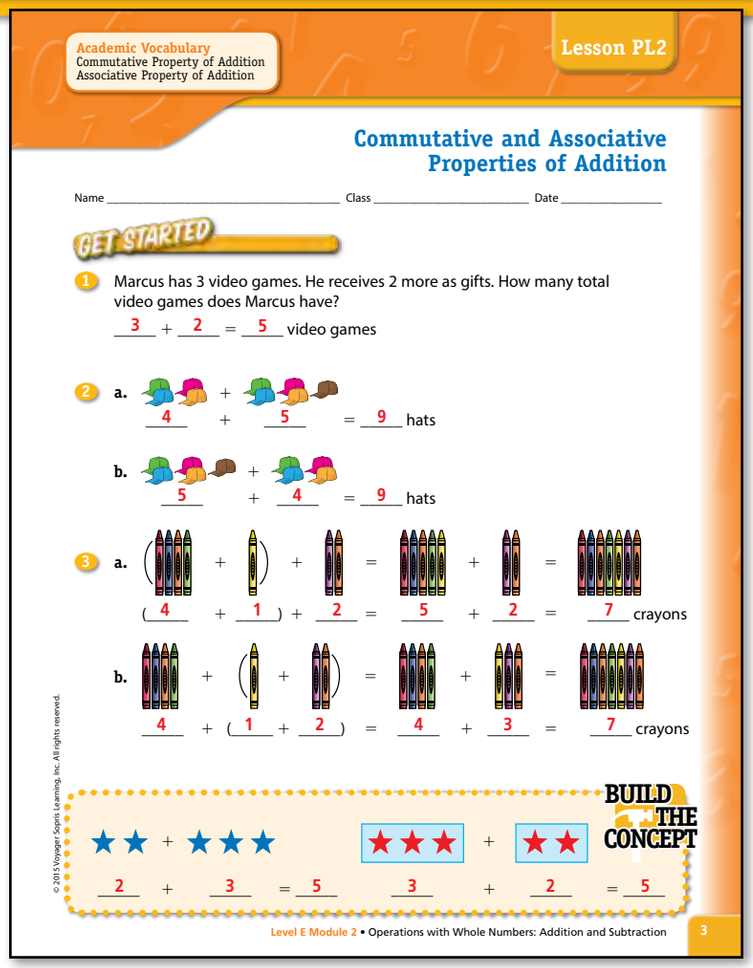
Objective

To use the Commutative and Associative Properties of Addition

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **Commutative Property of Addition** states that the order of the addends can be changed without affecting the sum
- **Associative Property of Addition** states that the grouping of the addends can be changed without affecting the sum



GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

To find the total number of video games that Marcus has, add the number of video games he received as gifts to the number he already has. How many video games did Marcus have to start with? (3) **How many video games did Marcus receive as gifts?** (2) **What is the sum of 3 and 2?** (5)

MODEL NEW SKILLS

Problem 2

Look at problem 2a. This problem shows 4 hats plus 5 hats. Use the doubles plus 1 strategy to find the sum. What is 4 plus 4? (8) **What is 8 plus 1?** (9) **What is 4 plus 5?** (9) **There are 9 hats.**

Look at problem 2b. This problem shows 5 hats plus 4 hats. Use the doubles plus 1 strategy again for this problem. What is 5 plus 4? (9) **Notice that 4 plus 5 has the same sum as 5 plus 4.**

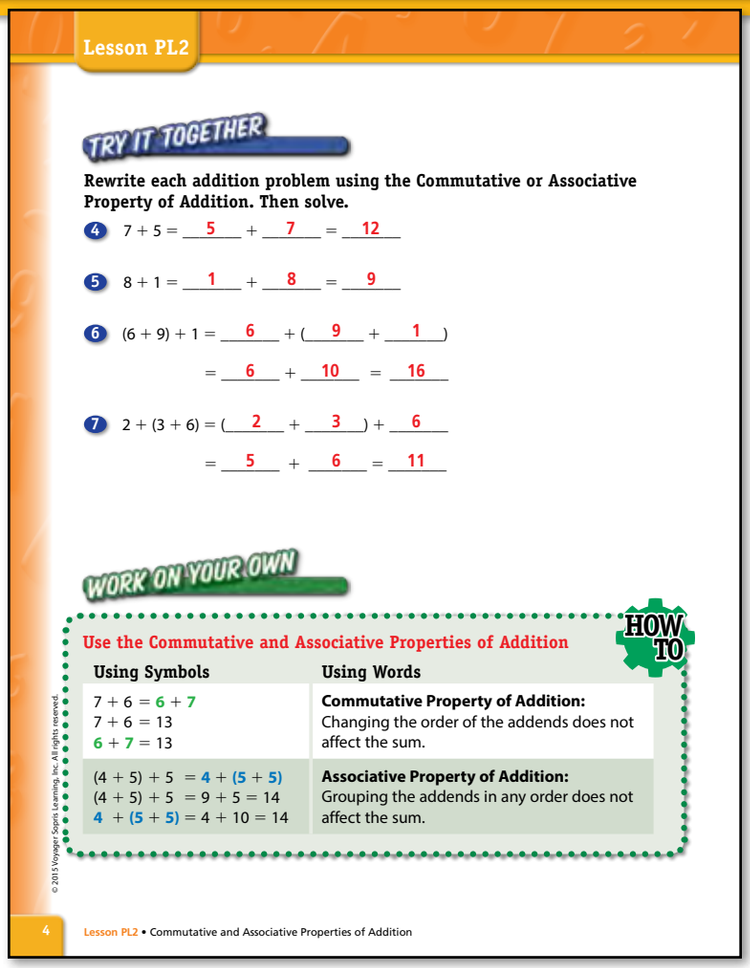
In addition problems, the order of the addends does not matter. This is called the Commutative Property of Addition.

Problem 3

Look at problem 3a. This problem shows 4 crayons, 1 crayon, and 2 crayons. Which numbers of crayons are grouped inside the parentheses? (4 and 1) **Which number of crayons is outside the parentheses?** (2) **Because 4 plus 1 is inside the parentheses, add 4 and 1 first. What is 4 plus 1?** (5) **Now add 5 and 2. What is 5 plus 2?** (7) **How many total crayons are there?** (7)

In problem 3b, which numbers of crayons are grouped inside the parentheses? (1 and 2) **Which number of crayons is outside the parentheses?** (4) **First, add the numbers inside the parentheses. What is 1 plus 2?** (3) **Now add 4 and 3. What is 4 plus 3?** (7) **How many total crayons are there?** (7)

When adding three numbers, the grouping of the addends does not change the sum. This is called the Associative Property of Addition.



Lesson PL2

TRY IT TOGETHER

Rewrite each addition problem using the Commutative or Associative Property of Addition. Then solve.

4. 7 + 5 = __5__ + __7__ = __12__

5. 8 + 1 = __1__ + __8__ = __9__

6. (6 + 9) + 1 = __6__ + (__9__ + __1__)
= __6__ + __10__ = __16__

7. 2 + (3 + 6) = (__2__ + __3__) + __6__
= __5__ + __6__ = __11__

WORK ON YOUR OWN

HOW TO

Use the Commutative and Associative Properties of Addition

Using Symbols	Using Words
7 + 6 = 6 + 7 7 + 6 = 13 6 + 7 = 13	**Commutative Property of Addition:** Changing the order of the addends does not affect the sum.
(4 + 5) + 5 = 4 + (5 + 5) (4 + 5) + 5 = 9 + 5 = 14 4 + (5 + 5) = 4 + 10 = 14	**Associative Property of Addition:** Grouping the addends in any order does not affect the sum.

4 Lesson PL2 • Commutative and Associative Properties of Addition

BUILD THE CONCEPT

Model how to use the Commutative and Associative Properties of Addition.

Look at the first model of the stars representing an addition problem. How many stars are there before the plus sign? (2) **How many stars are there after the plus sign?** (3) **How many total stars are there?** (5)

Using the Commutative Property of Addition, draw pictures that represent the same sum of stars. How many stars should be drawn in the first box? (3) **How many should be drawn in the second box?** (2) **How many total stars are there in the two pictures?** (5)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 4

Look at the addition problem in problem 4. Which property can be used to rewrite the problem another way having the same sum? (Commutative Property of Addition)

How can 7 plus 5 be rewritten using this property? (5 + 7) **What is 7 plus 5?** (12) **What is 5 plus 7?** (12) **Either way the problem is written, the sum is 12.**

Problem 5

Which property can be used to rewrite the problem another way having the same sum? (Commutative Property of Addition)

How can 8 plus 1 be rewritten using this property? (1 + 8) **What is 8 plus 1?** (9) **What is 1 plus 8?** (9) **Either way the problem is written, the sum is 9.**

Problem 6

Which property can be used to rewrite the problem another way having the same sum? (Associative Property of Addition)

Using this property, what is another way this addition problem can be rewritten by moving the parentheses? (6 + (9 + 1)) **To solve this problem, find the sum inside the parentheses first. What is 9 plus 1?** (10) **Now, what is 6 plus 10?** (16)

Problem 7

Which property can be used to rewrite the problem another way having the same sum? (Associative Property of Addition)

Using this property, what is another way this addition problem can be rewritten by moving the parentheses? ((2 + 3) + 6) **To solve this problem, find the sum inside the parentheses first. What is 2 plus 3?** (5) **Now, what is 5 plus 6?** (11)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING

This problem illustrates the **Using a Picture** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem involving a picture. The instruction is immediately followed by application of the strategy in problem 16.

The problem is shown using pictures.

Have students identify which ribbons are first-place ribbons and which ribbons are second-place ribbons. The first-place ribbons are blue and the second-place ribbons are red.

Ask students to add the first-place and second-place ribbons for each person.

Terry has 2 first-place ribbons and 4 second-place ribbons. Terry has a total of 6 ribbons.

Lauren has 4 first-place ribbons and 2 second-place ribbons. Lauren has a total of 6 ribbons.

Ask students to compare the total number of ribbons that each person has.

6 ribbons = 6 ribbons

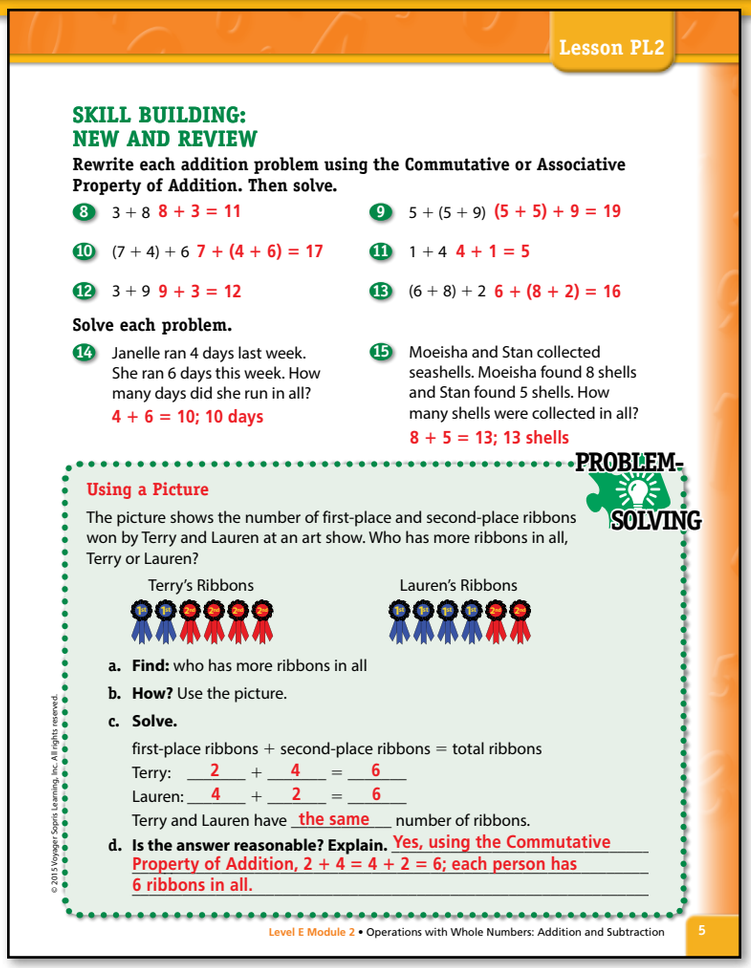
Both people have the same number of ribbons.

The pictures illustrate the Commutative Property of Addition. The first picture shows 2 blue ribbons plus 4 red ribbons. The second picture shows 4 blue ribbons plus 2 red ribbons.

Both pictures show the same number of ribbons in all.

Problems 8–19

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.



Lesson PL2

SKILL BUILDING: NEW AND REVIEW

Rewrite each addition problem using the Commutative or Associative Property of Addition. Then solve.

8. 3 + 8 8 + 3 = 11
9. 5 + (5 + 9) (5 + 5) + 9 = 19
10. (7 + 4) + 6 7 + (4 + 6) = 17
11. 1 + 4 4 + 1 = 5
12. 3 + 9 9 + 3 = 12
13. (6 + 8) + 2 6 + (8 + 2) = 16

Solve each problem.

14. Janelle ran 4 days last week. She ran 6 days this week. How many days did she run in all?
4 + 6 = 10; 10 days

15. Moeisha and Stan collected seashells. Moeisha found 8 shells and Stan found 5 shells. How many shells were collected in all?
8 + 5 = 13; 13 shells

PROBLEM-SOLVING

Using a Picture

The picture shows the number of first-place and second-place ribbons won by Terry and Lauren at an art show. Who has more ribbons in all, Terry or Lauren?

Terry's Ribbons

Lauren's Ribbons

a. **Find:** who has more ribbons in all

b. **How?** Use the picture.

c. **Solve.**

first-place ribbons + second-place ribbons = total ribbons

Terry: 2 + 4 = 6

Lauren: 4 + 2 = 6

Terry and Lauren have the same number of ribbons.

d. **Is the answer reasonable? Explain.** Yes, using the Commutative Property of Addition, 2 + 4 = 4 + 2 = 6; each person has 6 ribbons in all.

CHECK UP

ASSESS INFORMALLY

Error Analysis

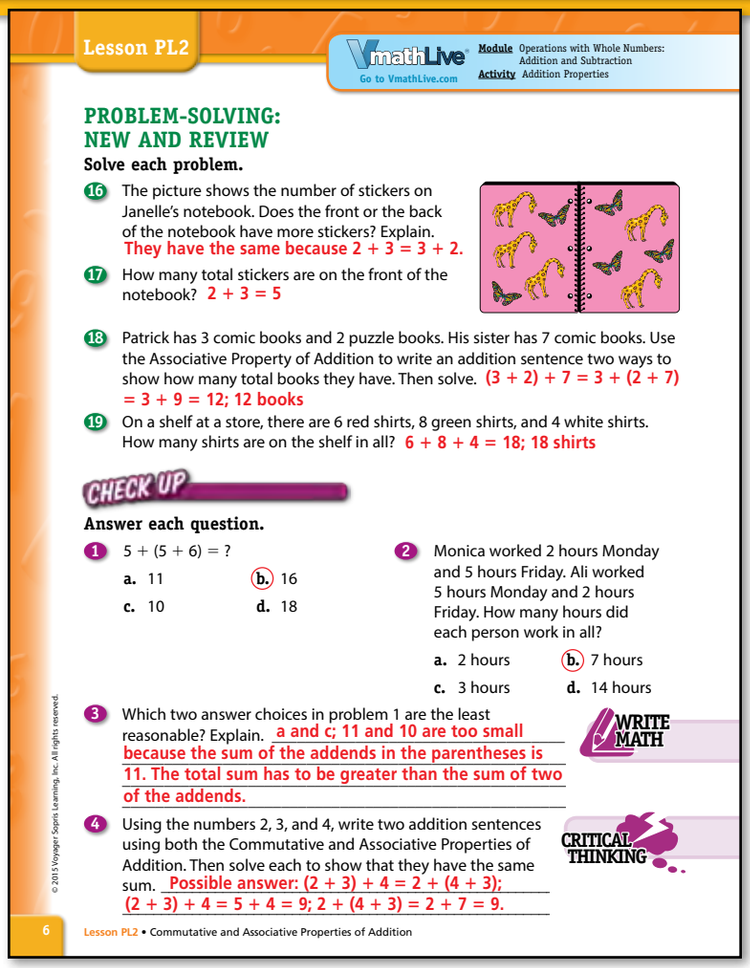
Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered problem 1 incorrectly: The student did not add or use the Associative Property of Addition correctly. Use Additional Resources in E.2.PL2 to review the Associative Property of Addition.

If student answered problem 2 incorrectly: The student did not add or use the Commutative Property of Addition correctly. Use Additional Resources in E.2.PL2 to review the Commutative Property of Addition.

WRITE MATH

If student answered problem 3 incorrectly: While students work together, remind the student that the addition in the parentheses should be worked first, so the sum of all three numbers should be greater than that sum.



Lesson PL2

VmathLive Go to VmathLive.com
Module Operations with Whole Numbers: Addition and Subtraction
Activity Addition Properties

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

16 The picture shows the number of stickers on Janelle's notebook. Does the front or the back of the notebook have more stickers? Explain. They have the same because 2 + 3 = 3 + 2.

17 How many total stickers are on the front of the notebook? 2 + 3 = 5

18 Patrick has 3 comic books and 2 puzzle books. His sister has 7 comic books. Use the Associative Property of Addition to write an addition sentence two ways to show how many total books they have. Then solve. (3 + 2) + 7 = 3 + (2 + 7) = 3 + 9 = 12; 12 books

19 On a shelf at a store, there are 6 red shirts, 8 green shirts, and 4 white shirts. How many shirts are on the shelf in all? 6 + 8 + 4 = 18; 18 shirts

CHECK UP

Answer each question.

1 5 + (5 + 6) = ?
a. 11 b. 16 c. 10 d. 18

2 Monica worked 2 hours Monday and 5 hours Friday. Ali worked 5 hours Monday and 2 hours Friday. How many hours did each person work in all?
a. 2 hours b. 7 hours c. 3 hours d. 14 hours

3 Which two answer choices in problem 1 are the least reasonable? Explain. a and c; 11 and 10 are too small because the sum of the addends in the parentheses is 11. The total sum has to be greater than the sum of two of the addends.

WRITE MATH

4 Using the numbers 2, 3, and 4, write two addition sentences using both the Commutative and Associative Properties of Addition. Then solve each to show that they have the same sum. Possible answer: (2 + 3) + 4 = 2 + (4 + 3); (2 + 3) + 4 = 5 + 4 = 9; 2 + (4 + 3) = 2 + 7 = 9.

CRITICAL THINKING

DIFFERENTIATION

Additional Resources

VmathLive

Module: Operations with Whole Numbers: Addition and Subtraction

Activity: Addition Properties

Vmath Reteach

Reteach Student Module 2 Lesson PL2

Reteach Teacher Module 2 Lesson PL2

Extra Practice

Student Book page 41

Technology

Have students review the Animated Glossary on VmathLive for reinforcement of math vocabulary. Additional digital content is available through this feature in the eBook.

English Language Learners

Use the VmathLive Animated Glossary to review the terms *Commutative Property* and *Associative Property*. Demonstrate the vocabulary at the beginning of the lesson as students gather around the computer screen or through a projection system if possible.

Have students make index cards for the new math terms. Have them write their own word or provide an "English-friendly" word to replace the math term. For example, rather than saying the *Commutative Property of Addition*, students can say the word *order*. Rather than saying the *Associative Property of Addition*, students can say the word *group*.

The words *order* and *group* will help students remember that the order and grouping of the addends does not affect the sum. Provide students with examples of each property to write on their index cards.

Students with Special Needs

To help students better understand the Associative Property of Addition, write the addition sentence (2 + 4) + 9 on the board. Tell students to add the two numbers in the parentheses together. Ask a student for the sum. Write the sum below the parentheses and write + 9. Tell students that 2 plus 4 is 6; now they need to add 9 more. Have students count on 9 more. Have students say the sum. Erase the parentheses and draw new parentheses around 4 + 9. Have a student explain what to do next. Allow students to solve the problem. Discuss with students why the sum stays the same.

HANDS-ON GUIDED DISCOVERY

Lesson 1

Objective

To use base-10 pieces to model addition of whole numbers

CONCEPTUAL DEVELOPMENT

Materials

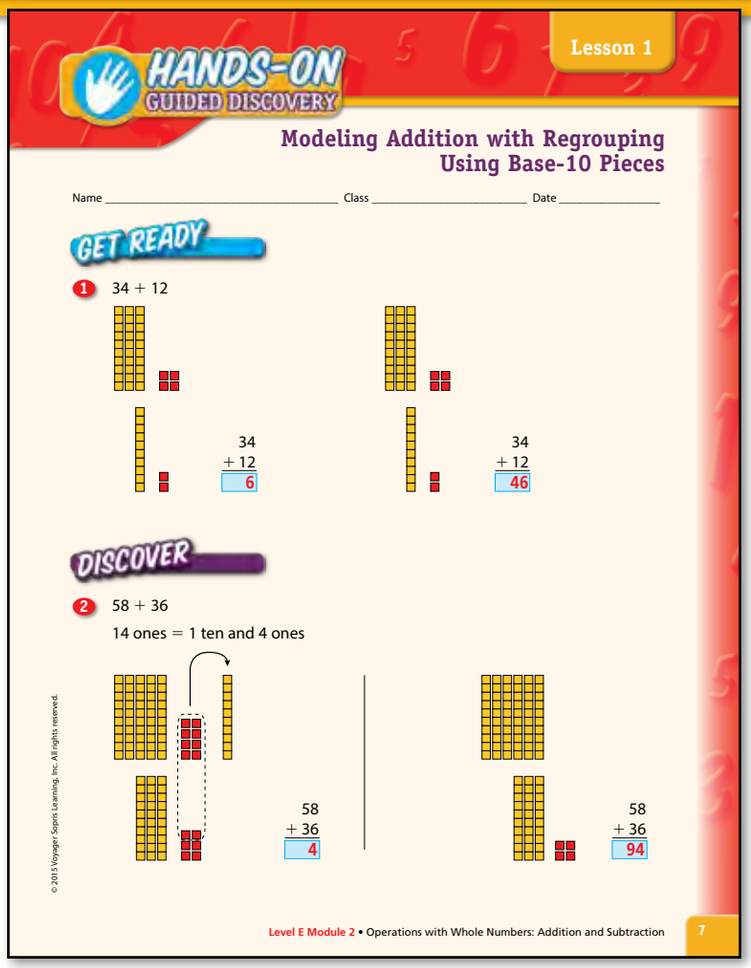
- base-10 pieces
- grid paper (optional)

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and base-10 pieces. In this lesson, students focus on regrouping ones to make a 10 when adding 2-digit numbers. Each student will need at least 9 tens rods and 18 ones blocks. If students do not have base-10 pieces, have them use tens rods and ones blocks cut from grid paper.

Make sure students understand that 10 ones blocks are equivalent to 1 tens rod. To help visual learners make this connection, have students make a column of 10 ones blocks and compare it with 1 tens rod.

Review renaming values using tens rods and ones blocks. Have students model 15 with 15 ones blocks. Then have them regroup by trading 10 ones blocks for a tens rod. Point out that 15 ones blocks and 1 tens rod and 5 ones blocks are equivalent models. Repeat with other numbers from 11 to 18.


HANDS-ON GUIDED DISCOVERY

Lesson 1

Modeling Addition with Regrouping Using Base-10 Pieces

Name _____ Class _____ Date _____

GET READY

1 34 + 12

34 + 12 = 6

34 + 12 = 46

DISCOVER

2 58 + 36

14 ones = 1 ten and 4 ones

58 + 36 = 4

58 + 36 = 94

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 7

GET READY

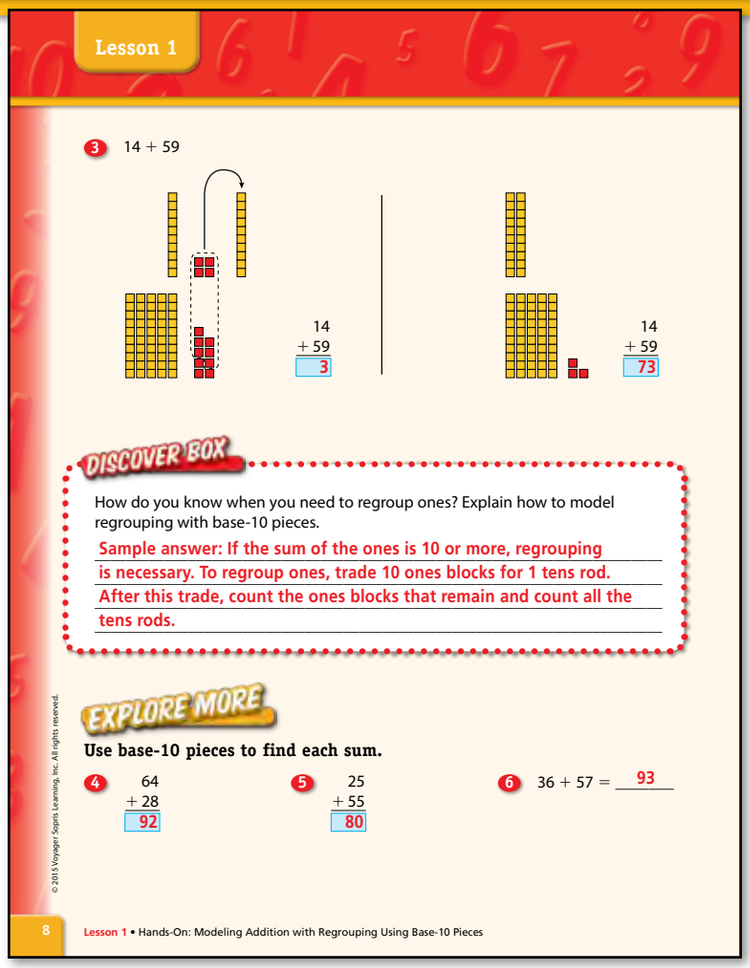
Problem 1

What numbers will be added in problem 1? (34 and 12) **Use base-10 pieces to model the first addend, 34. How many tens rods do you need to model 34?** (3) **Place 3 tens rods on your desk. How many ones blocks do you need?** (4) **Place 4 ones blocks on your desk. What is the second addend?** (12) **How many tens rods do you need to model 12?** (1) **Place 1 tens rod on your desk. How many ones blocks do you need?** (2) **Place 2 ones blocks on your desk. To add 34 and 12, start with the ones blocks. How many ones blocks are there in all?** (6) **The sum of the ones is 6. Write 6 in the ones column under the equal bar. Now add the tens rods. How many tens rods are there altogether?** (4) **Write 4 in the tens column under the equal bar and 6 in the ones column, as found before. Altogether, there are 4 tens rods and 6 ones blocks. What is the sum of 34 and 12?** (46)

DISCOVER

Problem 2

What numbers will be added in problem 2? (58 and 36) **What is the first addend?** (58) **How many tens rods do you need to model 58?** (5) **Place 5 tens rods on your desk. How many ones blocks do you need?** (8) **Place 8 ones blocks on your desk. What is the second addend?** (36) **How many tens rods do you need to model 36?** (3) **Place 3 tens rods on your desk. How many ones blocks do you need?** (6) **Place 6 ones blocks on your desk. Count the ones blocks first. How many ones blocks are there in all?** (14) **You can write only one digit in the ones column to show the sum of the ones. Can you write 14 in the ones column?** (no) **Regroup 14 ones as 1 ten and 4 ones. How can you use base-10 pieces to show this?** (Trade 10 ones blocks for 1 tens rod.) **Trade 10 ones blocks for 1 tens rod on your desk. The sum**


Lesson 1

3 14 + 59

14
+ 59
3

14
+ 59
73

DISCOVER BOX

How do you know when you need to regroup ones? Explain how to model regrouping with base-10 pieces.

Sample answer: If the sum of the ones is 10 or more, regrouping is necessary. To regroup ones, trade 10 ones blocks for 1 tens rod. After this trade, count the ones blocks that remain and count all the tens rods.

EXPLORE MORE

Use base-10 pieces to find each sum.

4 64 + 28 = 92

5 25 + 55 = 80

6 36 + 57 = 93

8 Lesson 1 • Hands-On: Modeling Addition with Regrouping Using Base-10 Pieces

of the ones is 14, which can be modeled by 1 tens rod and 4 ones blocks. Write 4 in the ones column under the equal bar. Next, count the tens rods, including the new one from the trade. How many tens rods are there altogether? (9) **Write 9 in the tens column under the equal bar and 4 in the ones column, as found before. What is the sum of 58 and 36?** (94)

Problem 3

Use your base-10 pieces to model the addition in problem 3. What are the addends? (14 and 59) **Using base-10 pieces to show 14, how many tens rods do you need?** (1) **Place 1 tens rod on your desk. How many ones blocks do you need?** (4) **Place 4 ones blocks on your desk. What is the second addend?** (59) **How many tens rods do you need to model 59?** (5) **Place 5 tens rods on your desk. How many ones blocks do you need?** (9) **Place 9 ones blocks on your desk. How many ones are there in all?** (13) **Do you need to regroup the ones?** (yes) **Why?** (You can't write 13 in the ones column of the sum.) **How can you model how to regroup the ones?** (Trade 10 ones blocks for 1 tens rod to make 1 ten and 3 ones.) **Trade 10 ones blocks for 1 tens rod on your desk. How many ones blocks remain?** (3) **Where should you write the 3 ones in the problem?** (in the ones column under the bar) **How many tens rods are there, including the new tens rod from the trade?** (7) **Write 7 in the tens column under the equal bar and 3 in the ones column, as found before. What is the sum of 14 and 59?** (73)

DISCOVER BOX

In this lesson, you used base-10 pieces to model the addition of 2-digit numbers. Sometimes it is necessary to regroup in addition. Explain how you know when it is necessary to regroup. Think about how you used the base-10 pieces when you had to regroup. What did you do to show the regrouping? (Sample answer: If the sum of the ones has more than one digit, regrouping is necessary. To regroup ones, trade 10 ones blocks for 1 tens rod. After this trade, count the ones blocks that remain and count all the tens rods.)

EXPLORE MORE

Problems 4–6

Now that students understand how to use base-10 pieces to add 2-digit numbers with regrouping, students can use base-10 pieces to practice on their own.

Extension: Have students or partners explore using base-10 pieces to model more addition problems with regrouping.

Lesson Adaptations for Module 2

Lesson 2.2

In this lesson, students can include hundreds flats to extend using base-10 pieces to model adding 3-digit numbers with regrouping. Have them add the ones and regroup if needed. Then, have them add the tens and regroup if needed. Finally, have them add the hundreds. Prompt students to recognize that they need to regroup whenever the sum in any column has more than one digit.

Lesson 2

Objective

To add 3-digit whole numbers with regrouping

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

Is adding done from left to right or from right to left? (right to left) **Add the digits in the ones column. What is 8 plus 7?** (15) **Fifteen has two digits. Is regrouping needed?** (yes) **Fifteen ones is the same as 1 ten and 5 ones. Write 5 in the ones column under the equal bar and 1 above the tens column.**

Add the digits in the tens column. What is the sum of the top two digits? (7) **What is 7 plus 1?** (8) **Write 8 in the tens column under the equal bar. What is the sum of 68 and 17?** (85)

Problem 2

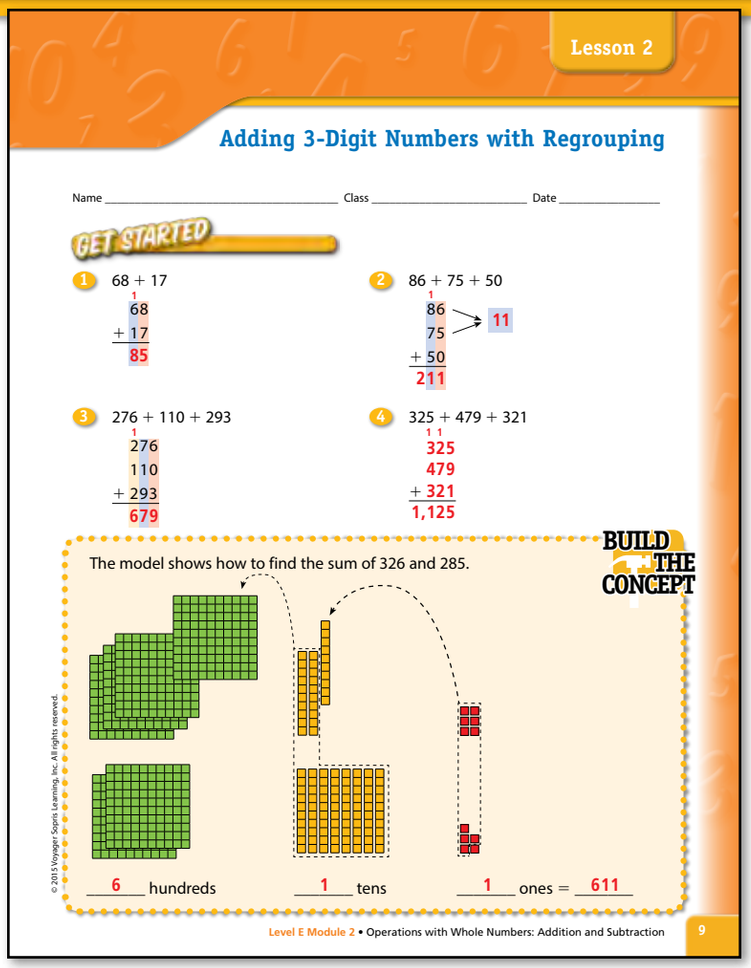
Add the first two digits in the ones column. What is 6 plus 5? (11) **What is 11 plus 0?** (11) **How many digits does 11 have?** (two) **Is regrouping needed?** (yes) **How can 11 be regrouped?** (1 ten and 1 one)

Regroup, then add the digits in the tens column. What is 1 plus 8? (9) **What is 9 plus 7?** (16) **What is 16 plus 5?** (21) **Twenty-one tens is the same as 2 hundreds and 1 ten. Write 1 in the tens column and 2 in the hundreds column under the equal bar. What is the sum of 86, 75, and 50?** (211)

MODEL NEW SKILLS

Problem 3

This problem has three 3-digit addends, but solving it is similar to the other problems. The first step is to write the problem vertically. This already has been done. Should the digits in the ones column or hundreds column be added first? (ones column) **What is 6 plus 0 plus 3?** (9) **This is a 1-digit number. Will it fit in the ones column?** (yes) **Is regrouping needed?** (no) **Write 9 in the ones column under the equal bar.**



Lesson 2

Adding 3-Digit Numbers with Regrouping

Name _____ Class _____ Date _____

GET STARTED

1. 68 + 17 → 68 + 17 = 85
2. 86 + 75 + 50 → 86 + 75 + 50 = 211 (11)
3. 276 + 110 + 293 → 276 + 110 + 293 = 679
4. 325 + 479 + 321 → 325 + 479 + 321 = 1,125

BUILD THE CONCEPT

The model shows how to find the sum of 326 and 285.

6 hundreds 1 tens 1 ones = 611

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 9

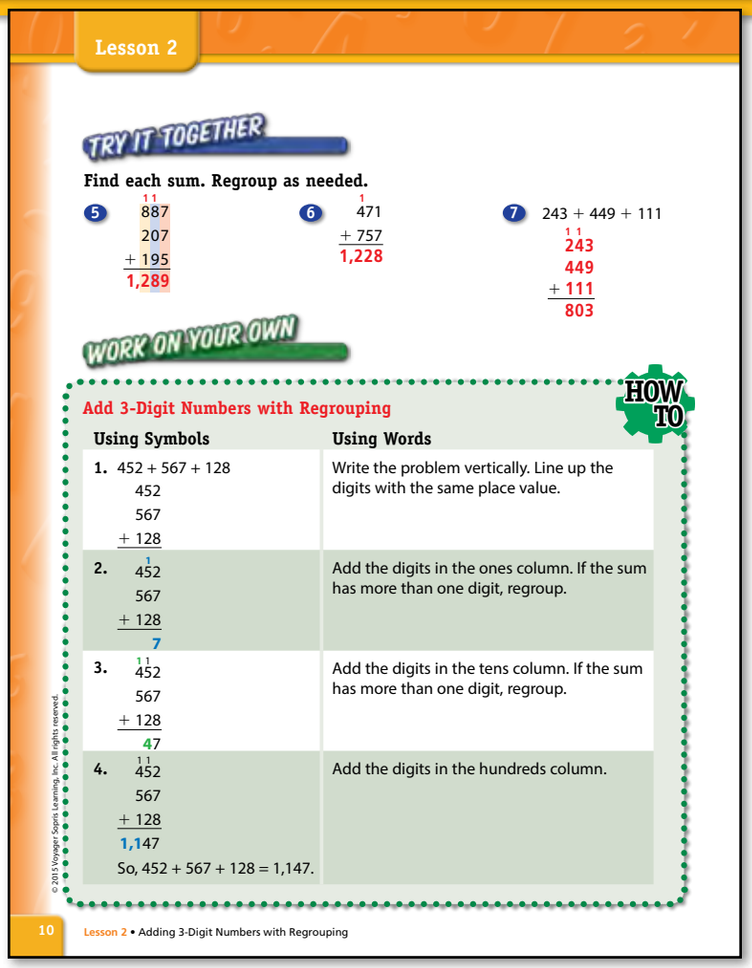
Next, add the digits in the tens column. What is 7 plus 1? (8) **What is 8 plus 9?** (17) **Seventeen has two digits. Will it fit in the tens column?** (no) **Regroup the 17 tens as 1 hundred and 7 tens. Write 7 under the equal bar in the tens column and 1 above the hundreds column.**

Now, add the digits in the hundreds column. What is 1 plus 2? (3) **What is 3 plus 1?** (4) **What is 4 plus 2?** (6) **Write 6 under the equal bar in the hundreds column. What is the sum of 276, 110, and 293?** (679)

Problem 4

What is the first step to solve this problem? (Write the problem vertically.) **Which column should be added first?** (ones column) **What is 5 plus 9 plus 1?** (15) **Will the sum fit in the ones column?** (no) **Is regrouping needed?** (yes) **Fifteen ones is the same as 1 ten and 5 ones. Write 5 in the ones column under the equal bar and 1 above the tens column.**

Next, add the digits in the tens column. What is 1 plus 2? (3) **What is 3 plus 7?** (10) **What is 10 plus 2?** (12) **Twelve has two digits. Will 12 fit in the tens column?** (no) **Regroup the 12 tens as 1 hundred and 2 tens. Write 2 under the equal bar in the tens column and 1 above the hundreds place.**



Lesson 2

TRY IT TOGETHER

Find each sum. Regroup as needed.

5 887 + 207 + 195 = 1,289

6 471 + 757 = 1,228

7 243 + 449 + 111 = 803

WORK ON YOUR OWN

Add 3-Digit Numbers with Regrouping

HOW TO

Using Symbols	Using Words
1. 452 + 567 + 128 452 567 + 128	Write the problem vertically. Line up the digits with the same place value.
2. 452 567 + 128 7	Add the digits in the ones column. If the sum has more than one digit, regroup.
3. 452 567 + 128 47	Add the digits in the tens column. If the sum has more than one digit, regroup.
4. 452 567 + 128 1,147 So, 452 + 567 + 128 = 1,147.	Add the digits in the hundreds column.

Now, add the digits in the hundreds column. What is 1 plus 3? (4) **What is 4 plus 4?** (8) **What is 8 plus 3?** (11) **Write 1 under the equal bar in the hundreds column and 1 in the thousands column under the equal bar. What is the sum of 325, 479, and 321?** (1,125)

BUILD THE CONCEPT

Model how to add 3-digit whole numbers with regrouping.

Look at the model for the problem 326 plus 285. The top model represents the first number, 326. Look at the bottom model. It represents the number 285.

To add 3-digit numbers, the ones must be added first. How many ones blocks are there in all? (11) **Because there are 10 or more ones blocks, regroup. A ring is drawn around 10 of the blocks. These 10 ones blocks can now be regrouped as 1 tens rod. This is shown by the arrow. How many ones blocks are left?** (1)

Now, count the number of tens rods. How many tens rods are there in all? (11) **Because there are 10 or more tens rods, regroup. A ring is drawn around 10 tens rods. These 10 tens rods can be regrouped as 1 hundreds flat. This is shown by the arrow. How many tens rods are left?** (1)

How many total hundreds flats are there now? (6) **So, the sum of 326 and 285 is 611.**

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

First, add the digits in the ones column. What is 7 plus 7 plus 5? (19) **Will a 2-digit number fit in the ones place?** (no) **How can 19 be regrouped?** (1 ten and 9 ones) **Write 9 under the equal bar in the ones column and 1 above the tens column.**

Next, add the digits in the tens column. What is 1 plus 8? (9) **What is 9 plus 0 plus 9?** (18) **How can 18 tens be regrouped?** (1 hundred and 8 tens) **Write 8 in the tens column under the equal bar and 1 above the hundreds column.**

Now, add the digits in the hundreds column. What is 1 plus 8? (9) **What is 9 plus 2?** (11) **What is 11 plus 1?** (12) **The sum has 12 hundreds. What digit should be written in the hundreds column under the equal bar?** (2) **What digit should be written in the thousands column?** (1) **What is the sum of 887, 207, and 195?** (1,289)

Problem 6

First, add the digits in the ones column. What is the sum? (8) **Where should the 8 be written?** (under the equal bar in the ones column) **Now, add the digits in the tens column. What is the sum?** (12) **Where will the digits of 12 be written?** (Write 2 in the tens column under the equal bar and 1 above the hundreds column.)

Last, add the digits in the hundreds column. What is the sum? (12) **Write 2 in the hundreds column and 1 in the thousands column under the equal bar. What is the sum of 471 and 757?** (1,228)

Problem 7

What is the first step? (Write the problem vertically.) **What column is added first?** (ones column) **What is the sum?** (13) **Regroup. Add the digits in the tens column. What is the sum?** (10) **Regroup. Add the digits in the hundreds column. What is the sum?** (8) **What is the sum of 243, 449, and 111?** (803)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING This problem illustrates the **Using a Table** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem involving a table. The instruction is immediately followed by application of the strategy in problem 20.

Have students read the problem.

Students are to find the total number of marbles that Mitsuo has.

Have students read the data in the sentence form:

Mitsuo has 129 red marbles.
Mitsuo has 219 blue marbles.
Mitsuo has 189 white marbles.

Students should then add the three numbers from the table to find the total:

$$\begin{array}{r} 129 \\ 219 \\ +\ 189 \\ \hline 537 \end{array}$$

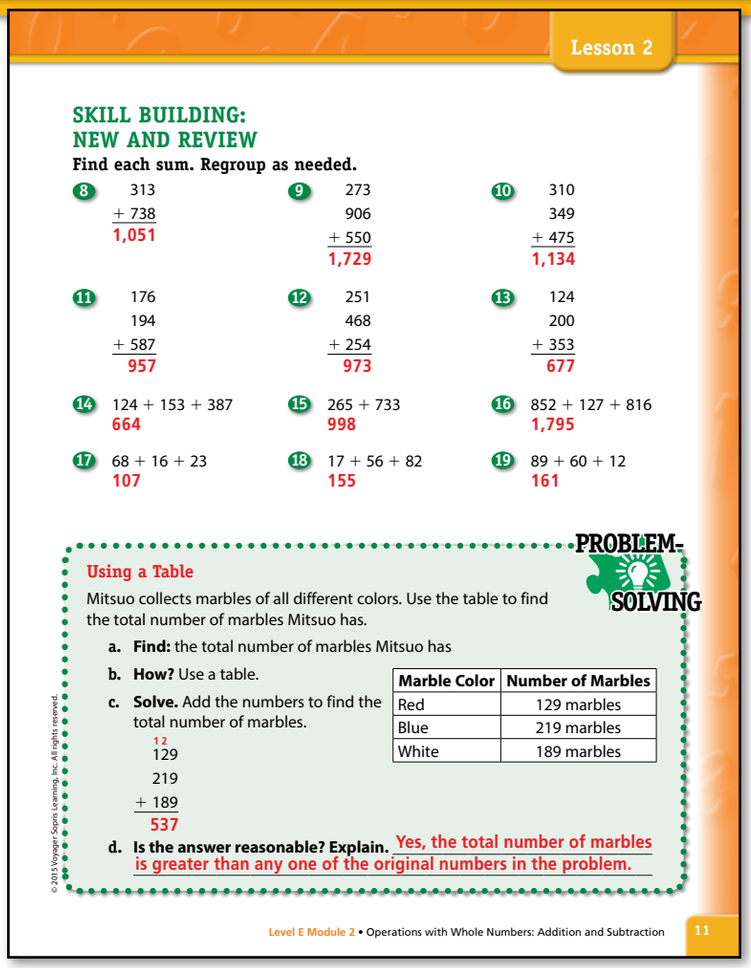
Show students that the sum is greater than any of the addends so the answer is reasonable.

Problems 8–23

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problem 23 Reminder

Make sure students state the operation needed to solve the problem. Then perform the operation to solve the problem.



Lesson 2

SKILL BUILDING: NEW AND REVIEW

Find each sum. Regroup as needed.

8	313 + 738 = 1,051	9	273 + 906 + 550 = 1,729
10	310 + 349 + 475 = 1,134	11	176 + 194 + 587 = 957
12	251 + 468 + 254 = 973	13	124 + 200 + 353 = 677
14	124 + 153 + 387 = 664	15	265 + 733 = 998
16	852 + 127 + 816 = 1,795	17	68 + 16 + 23 = 107
18	17 + 56 + 82 = 155	19	89 + 60 + 12 = 161

PROBLEM-SOLVING

Using a Table

Mitsuo collects marbles of all different colors. Use the table to find the total number of marbles Mitsuo has.

a. **Find:** the total number of marbles Mitsuo has

b. **How?** Use a table.

c. **Solve.** Add the numbers to find the total number of marbles.

Marble Color	Number of Marbles
Red	129 marbles
Blue	219 marbles
White	189 marbles

$$\begin{array}{r} {\scriptstyle 1\,2} \\ 129 \\ 219 \\ +\ 189 \\ \hline 537 \end{array}$$

d. **Is the answer reasonable? Explain.** Yes, the total number of marbles is greater than any one of the original numbers in the problem.

CHECK UP

ASSESS INFORMALLY

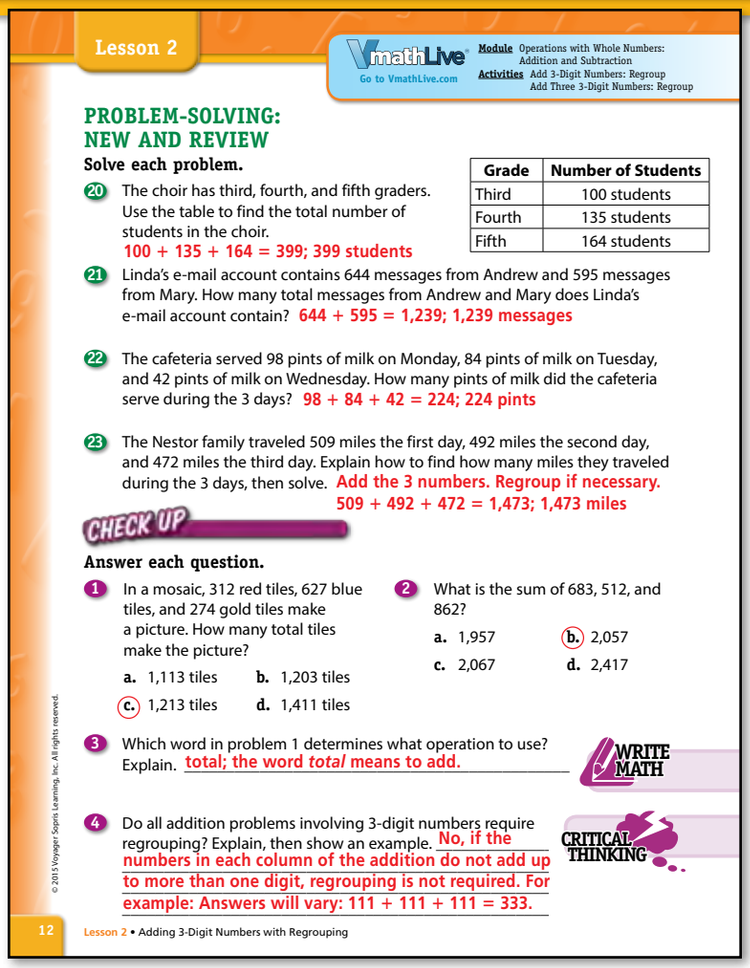
Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a, 1b, or 2a: The student forgot to record a 1 above the tens or hundreds column after regrouping. Use Additional Resources in E.2.2 and a place value chart to review regrouping.

If student answered 1d or 2d: The student regrouped backward. For example, if the sum of a column is 13, the student is writing the 1 under the equal bar and recording the 3 above the next column. Review place value and practice renaming 2-digit numbers.

WRITE MATH **If student answered problem 3 incorrectly:** While students work together, review with the student how to determine what operation to use to solve problems. Remind the student that the word *total* means to add.



Lesson 2

VmathLive Go to VmathLive.com
Module: Operations with Whole Numbers: Addition and Subtraction
Activities: Add 3-Digit Numbers: Regroup; Add Three 3-Digit Numbers: Regroup

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

Grade	Number of Students
Third	100 students
Fourth	135 students
Fifth	164 students

20 The choir has third, fourth, and fifth graders. Use the table to find the total number of students in the choir.
100 + 135 + 164 = 399; 399 students

21 Linda's e-mail account contains 644 messages from Andrew and 595 messages from Mary. How many total messages from Andrew and Mary does Linda's e-mail account contain? 644 + 595 = 1,239; 1,239 messages

22 The cafeteria served 98 pints of milk on Monday, 84 pints of milk on Tuesday, and 42 pints of milk on Wednesday. How many pints of milk did the cafeteria serve during the 3 days? 98 + 84 + 42 = 224; 224 pints

23 The Nestor family traveled 509 miles the first day, 492 miles the second day, and 472 miles the third day. Explain how to find how many miles they traveled during the 3 days, then solve. Add the 3 numbers. Regroup if necessary. 509 + 492 + 472 = 1,473; 1,473 miles

CHECK UP

Answer each question.

1 In a mosaic, 312 red tiles, 627 blue tiles, and 274 gold tiles make a picture. How many total tiles make the picture?
a. 1,113 tiles b. 1,203 tiles
c. 1,213 tiles d. 1,411 tiles

2 What is the sum of 683, 512, and 862?
a. 1,957 b. 2,057
c. 2,067 d. 2,417

3 Which word in problem 1 determines what operation to use? Explain. total; the word *total* means to add.

WRITE MATH

4 Do all addition problems involving 3-digit numbers require regrouping? Explain, then show an example. No, if the numbers in each column of the addition do not add up to more than one digit, regrouping is not required. For example: Answers will vary: 111 + 111 + 111 = 333.

CRITICAL THINKING

12 Lesson 2 • Adding 3-Digit Numbers with Regrouping

DIFFERENTIATION

Additional Resources

VmathLive

Module: Operations with Whole Numbers: Addition and Subtraction

Activities: Add 3-Digit Numbers: Regroup; Add Three 3-Digit Numbers: Regroup

Vmath Reteach

Reteach Student Module 2 Lesson 2

Reteach Teacher Module 2 Lesson 2

Extra Practice

Student Book page 41

Technology

Have students practice math fluency while competing against one another online in VmathLive activities. Online videos in VmathLive reinforce math concepts. Additional digital content is available through this feature in the eBook.

English Language Learners

Write *456 + 342 + 693* horizontally on two index cards. One card shows a sum of 1,491, and the other shows a sum of 14,811, where the regrouping in the ones column was skipped. Give the pair of cards to a small group of students and ask them to determine which sum is correct. If necessary, have students create a checklist of the process of adding 3-digit numbers for future use as they discuss the two problems.

Students with Special Needs

Write *134 + 159 + 296* vertically on the board. Have students form three groups. Have Group 1 add the numbers in the ones column (4 + 9 + 6). Once they have found the answer, have Group 1 say "19" and the class say "1 ten, 9 ones." Model how to write the 9 below the equal bar and the 1 above the tens column.

Have Group 2 add the numbers in the tens column (1 + 3 + 5 + 9), and say the number to the class (18). Again, have the class identify the number of hundreds and tens. Model how to regroup. Have Group 3 add the numbers in the hundreds column (1 + 1 + 1 + 2). Have them give the answer to the class, then write 5 below the equal bar in the hundreds column. Show that students have regrouped to solve the equation 134 + 159 + 296 = 589.

Lesson 3

Objective

To add multi-digit numbers with regrouping

Preskills	Lesson
Adding 3-Digit Numbers with Regrouping	E.2.2

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

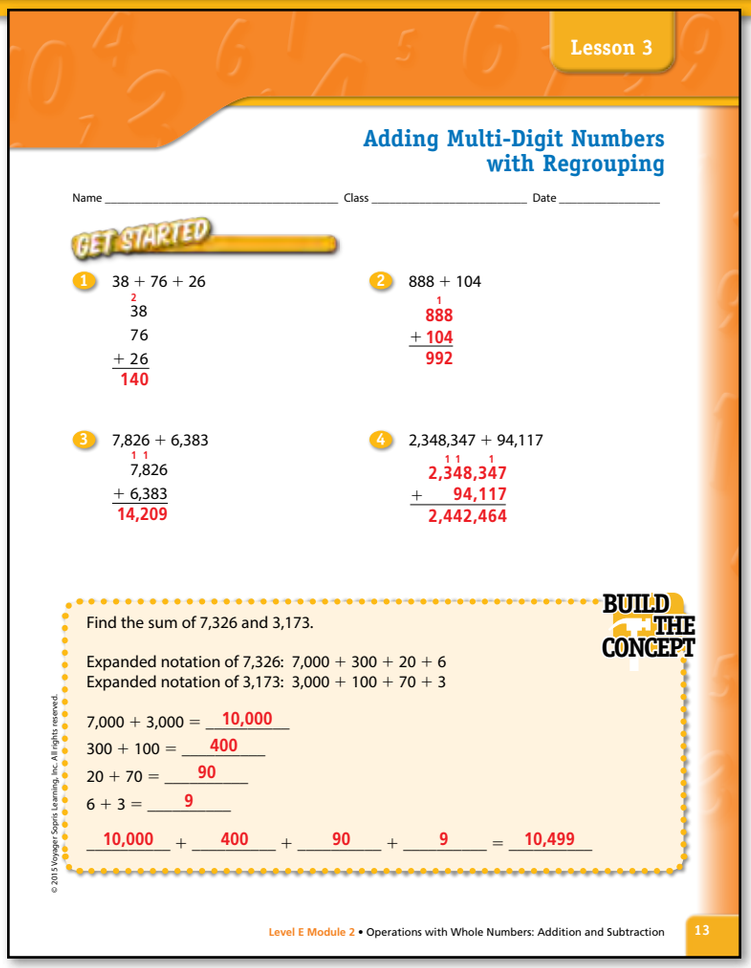
To add whole numbers, start with the ones column. What is the sum of 8 and 6? (14) **Add the next digit in the column. What is 14 plus 6?** (20) **Twenty has two digits and must be regrouped. Twenty ones is 2 tens and 0 ones. Write 0 in the ones column under the equal bar and 2 above the tens column.**

What is the sum of the digits in the tens column? (14) **Write 4 in the tens place and 1 in the hundreds place under the equal bar. What is the sum of 38, 76, and 26?** (140)

Problem 2

First, write the problem vertically by lining up the digits with the same place value. Add the digits in the ones column first, then move to the left. What is the sum of the digits in the ones column? (12) **Does 12 need to be regrouped?** (yes) **Where are the digits written?** (Write 2 in the ones column under the equal bar and 1 above the tens column.)

What is the sum of the digits in the tens column? (9) **Is there a need to regroup?** (no) **What is the sum of the digits in the hundreds column?** (9) **What is the sum of 888 and 104?** (992)



Lesson 3

Adding Multi-Digit Numbers with Regrouping

Name _____ Class _____ Date _____

GET STARTED

1. 38 + 76 + 26

   2
   38
   76
   + 26
   140

2. 888 + 104

   1
   888
   + 104
   992

3. 7,826 + 6,383

   1 1
   7,826
   + 6,383
   14,209

4. 2,348,347 + 94,117

   1 1 1
   2,348,347
   + 94,117
   2,442,464

BUILD THE CONCEPT

Find the sum of 7,326 and 3,173.

Expanded notation of 7,326: 7,000 + 300 + 20 + 6
Expanded notation of 3,173: 3,000 + 100 + 70 + 3

7,000 + 3,000 = 10,000
300 + 100 = 400
20 + 70 = 90
6 + 3 = 9

10,000 + 400 + 90 + 9 = 10,499

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 13

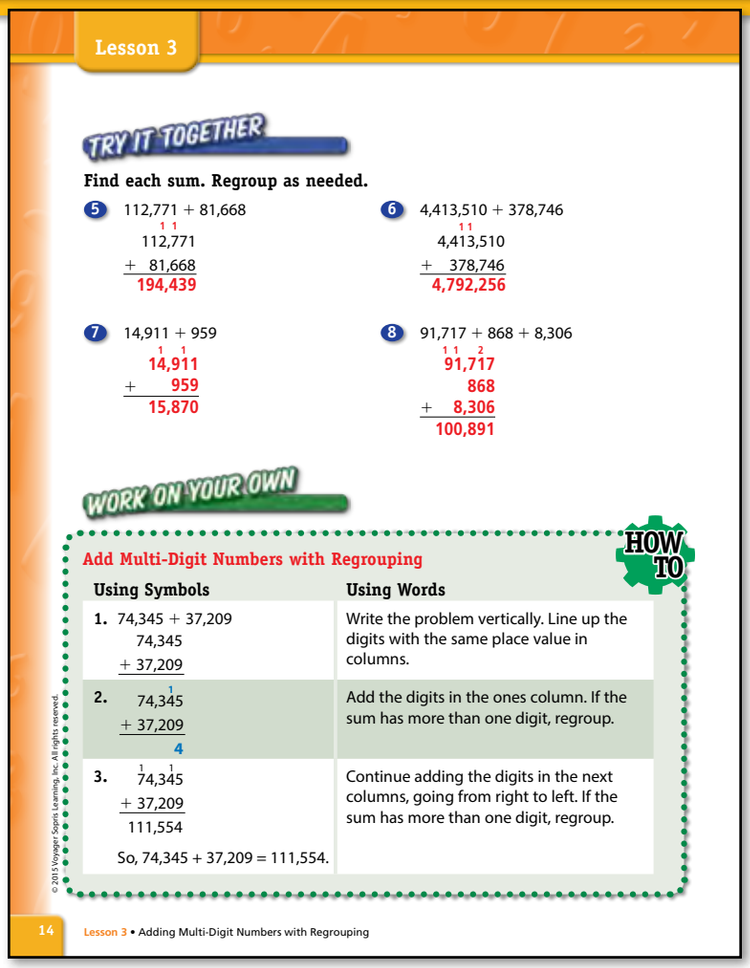
MODEL NEW SKILLS

Problem 3

What is the first step? (Write the problem vertically.) **This already has been done. Add the digits in the ones column first. What is the sum of the digits in the ones column?** (9) **Is regrouping necessary?** (no)

What is the sum of the digits in the tens column? (10) **Is regrouping necessary?** (yes) **Regroup 10 tens as 1 hundred and 0 tens. Write 0 in the tens column under the equal bar and 1 above the hundreds column.**

What is the next step? (Add the digits in the hundreds column.) **What is 1 plus 8?** (9) **What is 9 plus 3?** (12) **Twelve has two digits. Is regrouping necessary?** (yes) **How are the two digits written?** (Write 2 in the hundreds column under the equal bar and 1 above the thousands column.) **What is the sum of the digits in the thousands column?** (14) **Write 4 in the thousands column and 1 in the ten thousands place under the equal bar. What is the sum of 7,826 and 6,383?** (14,209)



Lesson 3

TRY IT TOGETHER

Find each sum. Regroup as needed.

5 112,771 + 81,668

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 112{,}771 \\ +\ 81{,}668 \\ \hline 194{,}439 \end{array}$$

6 4,413,510 + 378,746

$$\begin{array}{r} {\scriptstyle 1\ 1} \\ 4{,}413{,}510 \\ +\ 378{,}746 \\ \hline 4{,}792{,}256 \end{array}$$

7 14,911 + 959

$$\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 14{,}911 \\ +\ 959 \\ \hline 15{,}870 \end{array}$$

8 91,717 + 868 + 8,306

$$\begin{array}{r} {\scriptstyle 1\ 1\ \ 2} \\ 91{,}717 \\ 868 \\ +\ 8{,}306 \\ \hline 100{,}891 \end{array}$$

WORK ON YOUR OWN

HOW TO

Add Multi-Digit Numbers with Regrouping

Using Symbols	Using Words
1. $\begin{array}{r} 74{,}345 \\ +\ 37{,}209 \end{array}$	Write the problem vertically. Line up the digits with the same place value in columns.
2. $\begin{array}{r} {\scriptstyle 1} \\ 74{,}345 \\ +\ 37{,}209 \\ \hline 4 \end{array}$	Add the digits in the ones column. If the sum has more than one digit, regroup.
3. $\begin{array}{r} {\scriptstyle 1\ \ 1} \\ 74{,}345 \\ +\ 37{,}209 \\ \hline 111{,}554 \end{array}$	Continue adding the digits in the next columns, going from right to left. If the sum has more than one digit, regroup.
So, 74,345 + 37,209 = 111,554.	

14 Lesson 3 • Adding Multi-Digit Numbers with Regrouping

Problem 4

First, write the problem vertically. All the digits should line up with the same place values in columns. What is the sum of the digits in the ones column? (14) **Regroup 14 as 4 ones and 1 ten. Now, what is the sum of the digits in the tens column?** (6) **Is regrouping necessary?** (no)

Next, add the digits in the hundreds column. What is 3 plus 1? (4) **Is regrouping necessary?** (no) **What is the sum of the digits in the thousands column?** (12) **Is regrouping necessary?** (yes) **Regroup 12 as 1 ten thousand and 2 thousands.**

Now, add the digits in the ten thousands column. What is 1 plus 4 plus 9? (14) **Regroup. What numbers are to be added in the hundred thousands column?** (1 and 3) **What is 1 plus 3?** (4) **Write 4 in the hundred thousands column under the equal bar. The top number has 2 millions, and the bottom number doesn't have any millions. Write 2 in the millions column under the equal bar. What is the sum of 2,348,347 and 94,117?** (2,442,464)

BUILD THE CONCEPT

Model how to add multi-digit numbers using expanded notation.

Another way to find the sum of multi-digit numbers is to use each addend's expanded notation. What is the first addend of the problem 7,326 plus 3,173? (7,326) **To write this in expanded notation, break the number down by place value. The expanded notation is 7,000 + 300 + 20 + 6.**

Now look at the second addend. What is 3,173 written in expanded notation? (3,000 + 100 + 70 + 3) **Now, to find the sum of these two large numbers, first add the like place values together. What is 7,000 plus 3,000?** (10,000) **What is 300 plus 100?** (400) **What is 20 plus 70?** (90) **What is 6 plus 3?** (9)

Now that the place values have been found, the expanded form of the sum is 10,000 + 400 + 90 + 9. How is this written in standard form? (10,499) **So the sum of 7,326 and 3,173 is 10,499.**

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

This problem already has been written vertically. What is the sum of the digits in the ones column? (9) **What is the sum of the digits in the tens column?** (13) **Where will the digits of 13 be written?** (Write 3 in the tens column under the equal bar and 1 above the hundreds column.)

What is the sum of the digits in the hundreds column? (14) **Regroup. Add the digits in the thousands column. What is the sum?** (4) **Where should 4 be written?** (in the thousands column under the equal bar)

What is the sum of the digits in the ten thousands column? (9) **What is the sum of the digits in the next column?** (1) **What is the sum of 112,771 and 81,668?** (194,439)

Problem 6

This problem already has been written vertically. What is the sum of the digits in the ones column? (6) **What is the sum of the digits in the tens column?** (5) **What is the sum of the digits in the hundreds column?** (12) **Is regrouping necessary?** (yes)

Add the digits in the thousands column. What is the sum? (12) **Regroup. What is the sum of the digits in the ten thousands column?** (9) **What is the sum of the digits in the hundred thousands column?** (7) **What is the sum of the millions column?** (4) **What is the sum of 4,413,510 and 378,746?** (4,792,256)

Problem 7

First, write the problem vertically. Add the digits in columns from right to left. Regroup as needed. What is the sum of 14,911 and 959? (15,870)

Problem 8

What is the first step? (Rewrite the problem vertically.) **What is the sum?** (100,891)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 9–21

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

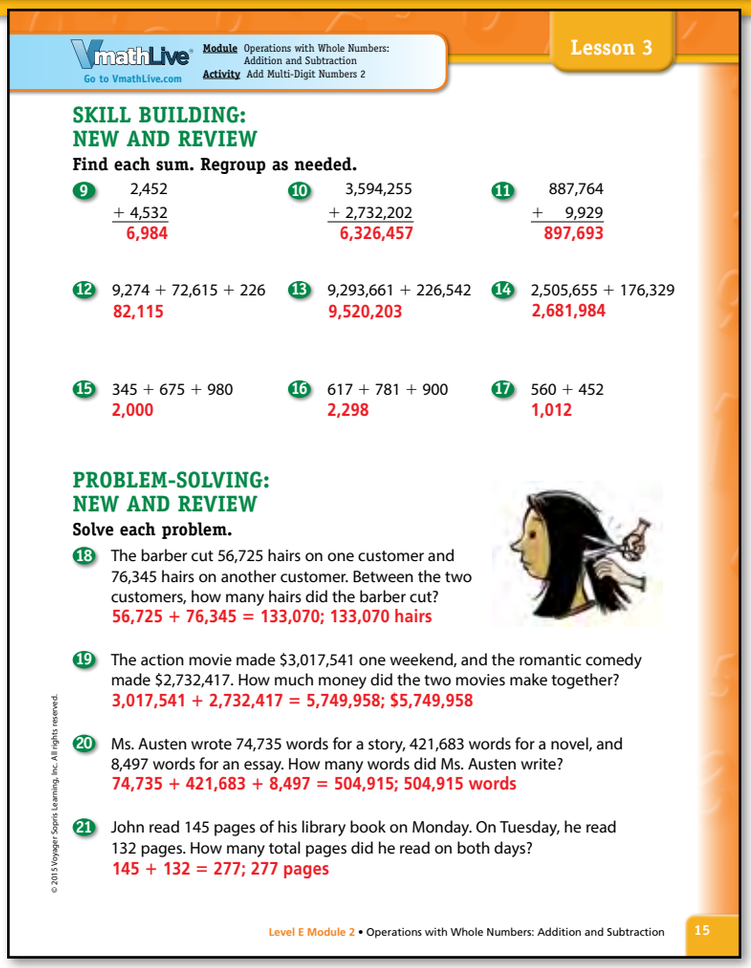
CHECK UP

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a: The student aligned the addends on the left instead of by place value in columns. Explain to the student that lining up the numbers on the right ensures adding ones to ones, tens to tens, and so on.



VmathLive Go to VmathLive.com
Module Operations with Whole Numbers: Addition and Subtraction
Activity Add Multi-Digit Numbers 2

Lesson 3

SKILL BUILDING: NEW AND REVIEW

Find each sum. Regroup as needed.

9. 2,452 + 4,532 = 6,984
10. 3,594,255 + 2,732,202 = 6,326,457
11. 887,764 + 9,929 = 897,693
12. 9,274 + 72,615 + 226 = 82,115
13. 9,293,661 + 226,542 = 9,520,203
14. 2,505,655 + 176,329 = 2,681,984
15. 345 + 675 + 980 = 2,000
16. 617 + 781 + 900 = 2,298
17. 560 + 452 = 1,012

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

18. The barber cut 56,725 hairs on one customer and 76,345 hairs on another customer. Between the two customers, how many hairs did the barber cut?
56,725 + 76,345 = 133,070; 133,070 hairs

19. The action movie made $3,017,541 one weekend, and the romantic comedy made $2,732,417. How much money did the two movies make together?
3,017,541 + 2,732,417 = 5,749,958; $5,749,958

20. Ms. Austen wrote 74,735 words for a story, 421,683 words for a novel, and 8,497 words for an essay. How many words did Ms. Austen write?
74,735 + 421,683 + 8,497 = 504,915; 504,915 words

21. John read 145 pages of his library book on Monday. On Tuesday, he read 132 pages. How many total pages did he read on both days?
145 + 132 = 277; 277 pages

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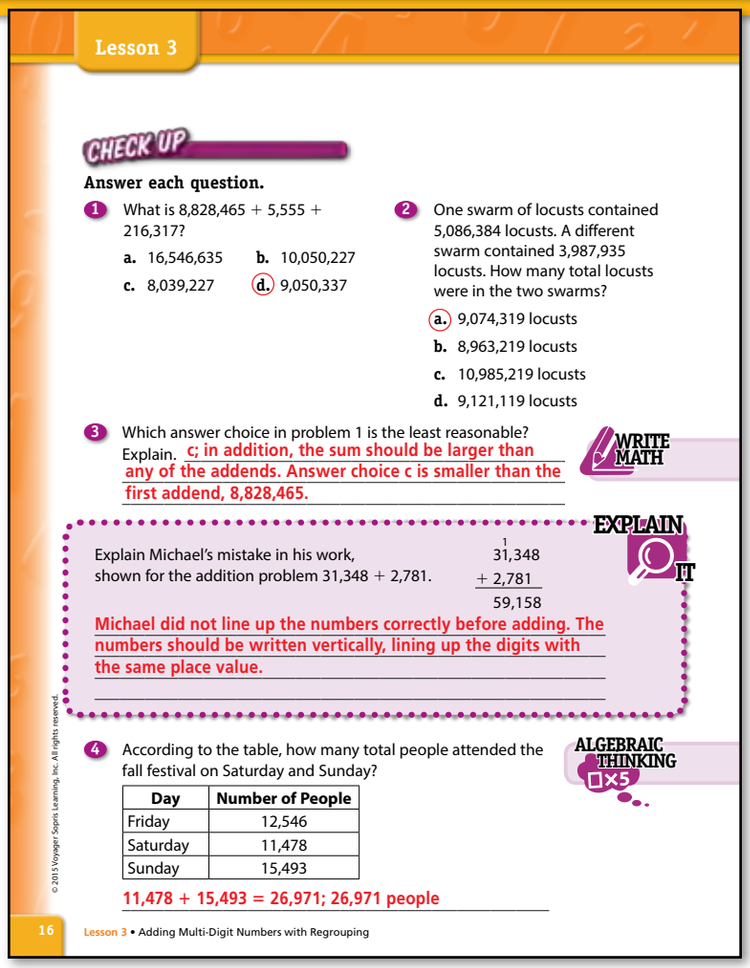
If student answered 1b or 2c: The student made regrouping and basic fact errors. Use Additional Resources in E.2.3 to reteach how to add multi-digit numbers with regrouping.

If student answered 1c or 2b: The student forgot to record the regrouped number above the next column when regrouping was needed. Use Additional Resources in E.2.3 to review how to add multi-digit numbers with regrouping.

If student answered 2d: The student regrouped incorrectly. For example, if the sum of a column was 13, the student wrote the 1 under the equal bar and recorded the 3 above the next column. Use Additional Resources in E.2.3 to reteach how to add multi-digit numbers with regrouping.

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student that the sum of any numbers should be greater than any one of the addends.



Lesson 3

CHECK UP

Answer each question.

1. What is 8,828,465 + 5,555 + 216,317?
   - **a.** 16,546,635
   - **b.** 10,050,227
   - **c.** 8,039,227
   - **d.** 9,050,337

2. One swarm of locusts contained 5,086,384 locusts. A different swarm contained 3,987,935 locusts. How many total locusts were in the two swarms?
   - **a.** 9,074,319 locusts
   - **b.** 8,963,219 locusts
   - **c.** 10,985,219 locusts
   - **d.** 9,121,119 locusts

3. Which answer choice in problem 1 is the least reasonable? Explain. c; in addition, the sum should be larger than any of the addends. Answer choice c is smaller than the first addend, 8,828,465.

WRITE MATH

EXPLAIN IT

Explain Michael's mistake in his work, shown for the addition problem 31,348 + 2,781.

$$\begin{array}{r} {\scriptstyle 1} \\ 31{,}348 \\ +\ 2{,}781 \\ \hline 59{,}158 \end{array}$$

Michael did not line up the numbers correctly before adding. The numbers should be written vertically, lining up the digits with the same place value.

4. According to the table, how many total people attended the fall festival on Saturday and Sunday?

ALGEBRAIC THINKING

Day	Number of People
Friday	12,546
Saturday	11,478
Sunday	15,493

11,478 + 15,493 = 26,971; 26,971 people

EXPLAIN IT As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.

DIFFERENTIATION

Additional Resources

VmathLive

Module: Operations with Whole Numbers: Addition and Subtraction

Activity: Add Multi-Digit Numbers 2

Vmath Reteach

Reteach Student Module 2 Lesson 3

Reteach Teacher Module 2 Lesson 3

Extra Practice

Student Book page 42

English Language Learners

Write *2,468 + 4,893* on a transparency. Have students record the problem on place value paper with regrouping squares above the tens, hundreds, and thousands. Tell students that the squares will help them remember to write the numbers when regrouping. Work together to add each column. For example, when students add the 8 and 3 in the ones column, show them how to write 1 below the equal bar and 1 in the square above the tens column. Guide students through the remaining columns.

Students with Special Needs

Provide students with a sheet of grid paper. On a transparency of the grid paper, write the problem *348,357 + 24,889* horizontally. Model for students how to rewrite the problem vertically so that the place values are aligned. Have students write the problem on their paper. Make sure students are writing one number in each square of the grid. Guide students through solving the problem. Put a sheet of white paper over all columns other than the ones column so that students can focus on that column, then move the paper to the left as each column is added. Repeat the activity with other multi-digit numbers.

HANDS-ON GUIDED DISCOVERY

Lesson 4

Objective

To use base-10 pieces to model subtraction of whole numbers

CONCEPTUAL DEVELOPMENT

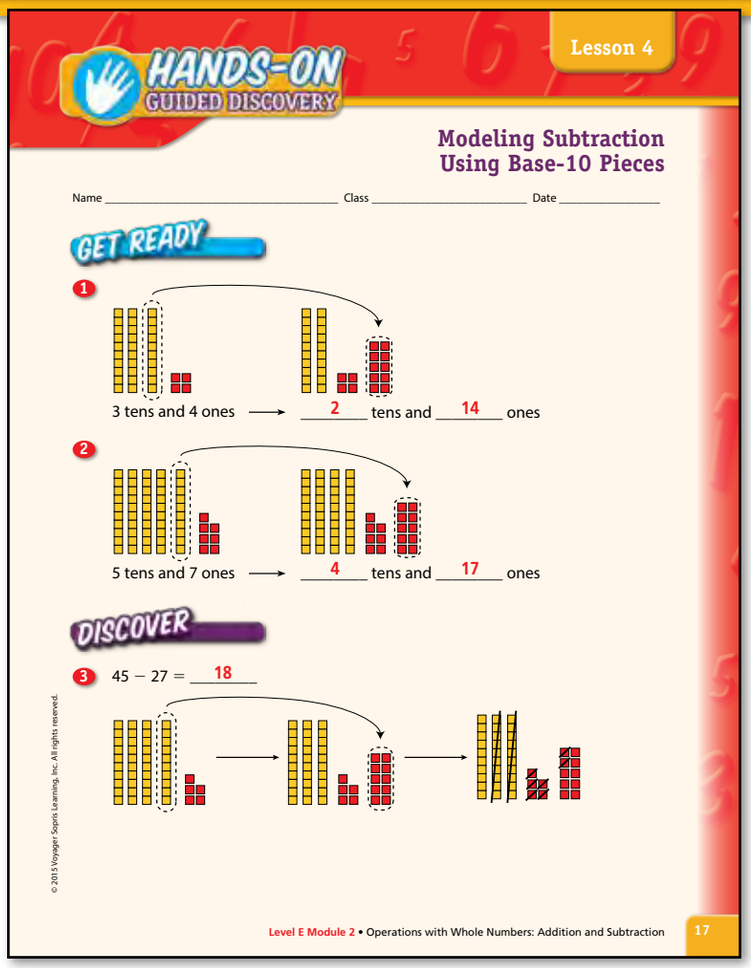
Materials

- base-10 pieces
- grid paper (optional)

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and base-10 pieces. In this lesson, students focus on regrouping tens when subtracting 2-digit numbers. Each student will need at least 9 tens rods and 18 ones blocks. If students do not have base-10 pieces, have them use tens and ones cut from grid paper.

Explain that using base-10 pieces is a good way to explore subtracting numbers with regrouping because you can see when a tens rod needs to be traded for 10 ones blocks.



GET READY

Problem 1

Use the base-10 pieces to model 34, as shown by the model on the left in problem 1. How many tens rods do you need? (3) **Place 3 tens rods on your desk. How many ones blocks do you need?** (4) **Place 4 ones blocks on your desk. Trade 1 tens rod for 10 ones blocks as shown by the model. How many tens rods do you have now?** (2) **Count the ones blocks. How many ones blocks do you have?** (14) **Write the value of the tens and ones modeled: 2 tens and 14 ones.**

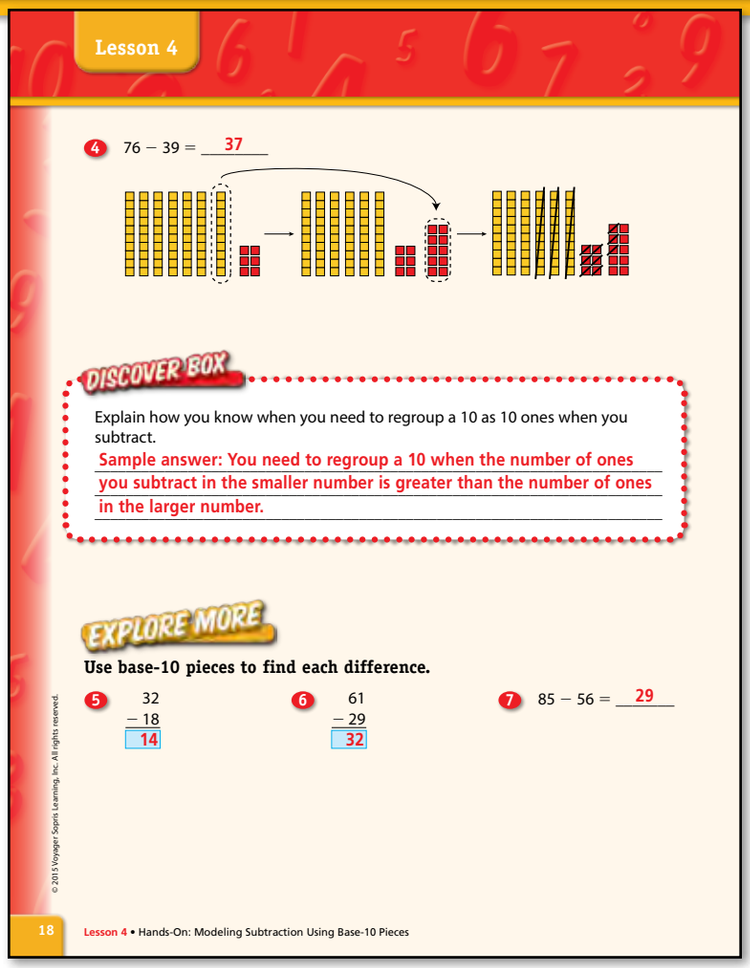
Problem 2

Use the base-10 pieces to model 57, as shown by the model on the left in problem 2. How many tens rods do you need? (5) **Place 5 tens rods on your desk. How many ones blocks do you need?** (7) **Place 7 ones blocks on your desk. Trade 1 tens rod for 10 ones blocks as shown by the model. How many tens rods do you have now?** (4) **Count the ones blocks. How many ones blocks are there?** (17) **Using the new model, how many tens and ones do you have?** (4 tens and 17 ones) **Write the value of the tens and ones modeled: 4 tens and 17 ones.**

DISCOVER

Problem 3

Use the base-10 pieces to model subtracting 27 from 45 in problem 3. Start by modeling 45. Place 4 tens rods and 5 ones blocks on your desk. To subtract 27 from 45, the model needs to have 2 tens rods and 7 ones blocks. Are 2 tens rods in the model of 45? (yes) **Are 7 ones blocks in the model of 45?** (no) **How can you change the model of 45 so there are enough ones blocks to take away 7?** (Trade 1 tens rod from 45 for 10 ones blocks.) **Model this on your desk. How many tens rods do you have now?** (3) **How many ones blocks do you have now?** (15) **Can you subtract 7 ones from 15 ones?** (yes) **Now let's subtract 27 from 45 using the model. Take away 7 ones blocks from your model. How many ones blocks remain?** (8) **Now, take away 2 tens rods**


Lesson 4

4 76 − 39 = 37

DISCOVER BOX

Explain how you know when you need to regroup a 10 as 10 ones when you subtract.

Sample answer: You need to regroup a 10 when the number of ones you subtract in the smaller number is greater than the number of ones in the larger number.

EXPLORE MORE

Use base-10 pieces to find each difference.

5 32 − 18 = 14

6 61 − 29 = 32

7 85 − 56 = 29

18 Lesson 4 • Hands-On: Modeling Subtraction Using Base-10 Pieces

from the model. How many tens rods remain? (1) **What number is modeled with 1 tens rod and 8 ones blocks?** (18) **What is the difference of 45 and 27?** (18)

Problem 4

Use the base-10 pieces to model subtracting 39 from 76 in problem 4. Start by modeling 76. Place 7 tens rods and 6 ones blocks on your desk. To subtract 39 from 76, the model needs to have 3 tens rods and 9 ones blocks. Are 3 tens rods in the model of 76? (yes) **Are 9 ones blocks in the model of 76?** (no) **How can you change the model of 76 so there are enough ones blocks to take away 9?** (Trade 1 tens rod for 10 ones blocks.) **Model this on your desk. How many tens rods do you have now?** (6) **How many ones blocks do you have now?** (16) **Now, subtract 39 from 76 using the model. Take 9 ones blocks from your model. How many ones blocks remain?** (7) **Finally, take away 3 tens rods from your model. How many tens rods remain?** (3) **What number is modeled with 3 tens rods and 7 ones blocks?** (37) **What is the difference of 76 and 39?** (37)

DISCOVER BOX

In this lesson, you used base-10 pieces to model subtracting 2-digit numbers with regrouping. Explain how you know when to regroup. (You need to regroup a 10 when the number of ones you subtract in the smaller number is greater than the number of ones in the larger number.) If students struggle with this explanation, have them model problems that need regrouping and problems that do not need regrouping. For example, tell students to model 63 − 29 and 63 − 21. Prompt them to explain that they need to regroup in 63 − 29 because the number of ones in the larger number is less than the number of ones being subtracted.

EXPLORE MORE

Problems 5–7

Now that students understand how to use base-10 pieces to subtract 2-digit numbers with regrouping, they can use models to practice on their own. Be sure students know how to write problem 7 in vertical form to subtract.

Extension: Have students or partners use base-10 pieces to model more subtraction problems.

Lesson Adaptations for Module 2

Lessons 2.6 and 2.7

In these lessons, students can include hundreds flats to extend using base-10 pieces to model subtracting 3-digit numbers. Prompt students to recognize that they need to regroup whenever the digit in the top number is less than the digit in the bottom number for each place value. When the top number involves zeros, students may need to regroup more than once.

Gizmos Guided Discovery

Lesson 5

Objective

To model subtraction with and without regrouping

WITH CONCEPTUAL DEVELOPMENT TECHNOLOGY

Materials

- Gizmo: Cargo Captain (Multi-digit Subtraction)

Gizmos Log In Instructions

- Log in to vmath.voyagersopris.com using your Username and Password provided in VPORT®.
- Select the Gizmos poster.
- Click on the Cargo Captain (Multi-digit Subtraction) Gizmo link.

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and are ready to work at the computers.

Complete problems 1–3 before students log in to the Cargo Captain (Multi-digit Subtraction) Gizmo.

Students can also enter the number directly into the box rather than use the slider to record the numbers. When Done is clicked, the number will be recorded in the display.

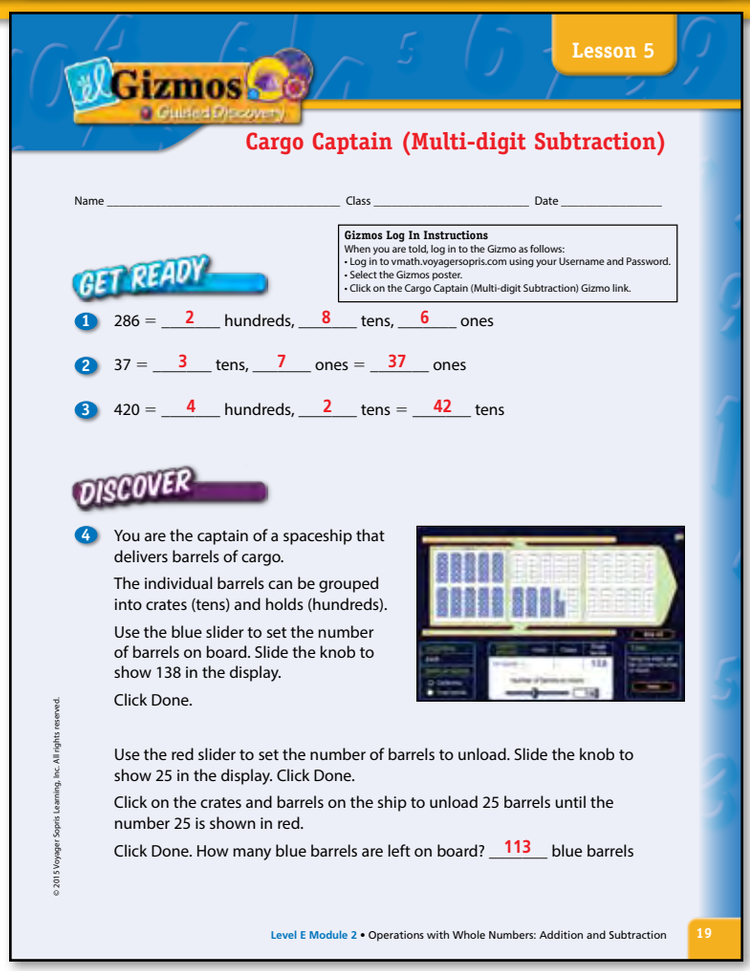
Point out that each section (hold or crate) of cargo can be unsealed by clicking on the little tab below the sealed cargo section. A section can be sealed again by clicking the little tab above the unsealed cargo section.

If students have additional time, have them answer Assessment Questions 1–5 in the Gizmo. They can click on the Check Your Answers button to see how well they did on the assessment.

GET READY

Problem 1

Each digit in a multi-digit number has a different value, depending upon its place in the number. How many hundreds, tens, and ones are in the number 286? (2 hundreds, 8 tens, 6 ones)



Gizmos Guided Discovery — Lesson 5

Cargo Captain (Multi-digit Subtraction)

Name _____ Class _____ Date _____

Gizmos Log In Instructions
When you are told, log in to the Gizmo as follows:
• Log in to vmath.voyagersopris.com using your Username and Password.
• Select the Gizmos poster.
• Click on the Cargo Captain (Multi-digit Subtraction) Gizmo link.

GET READY

1. 286 = 2 hundreds, 8 tens, 6 ones
2. 37 = 3 tens, 7 ones = 37 ones
3. 420 = 4 hundreds, 2 tens = 42 tens

DISCOVER

4. You are the captain of a spaceship that delivers barrels of cargo.
   The individual barrels can be grouped into crates (tens) and holds (hundreds).
   Use the blue slider to set the number of barrels on board. Slide the knob to show 138 in the display.
   Click Done.

Use the red slider to set the number of barrels to unload. Slide the knob to show 25 in the display. Click Done.
Click on the crates and barrels on the ship to unload 25 barrels until the number 25 is shown in red.
Click Done. How many blue barrels are left on board? 113 blue barrels

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Problem 2

How many tens and ones are in 37? (3 tens and 7 ones) **How many total ones are in 37?** (37 ones)

Problem 3

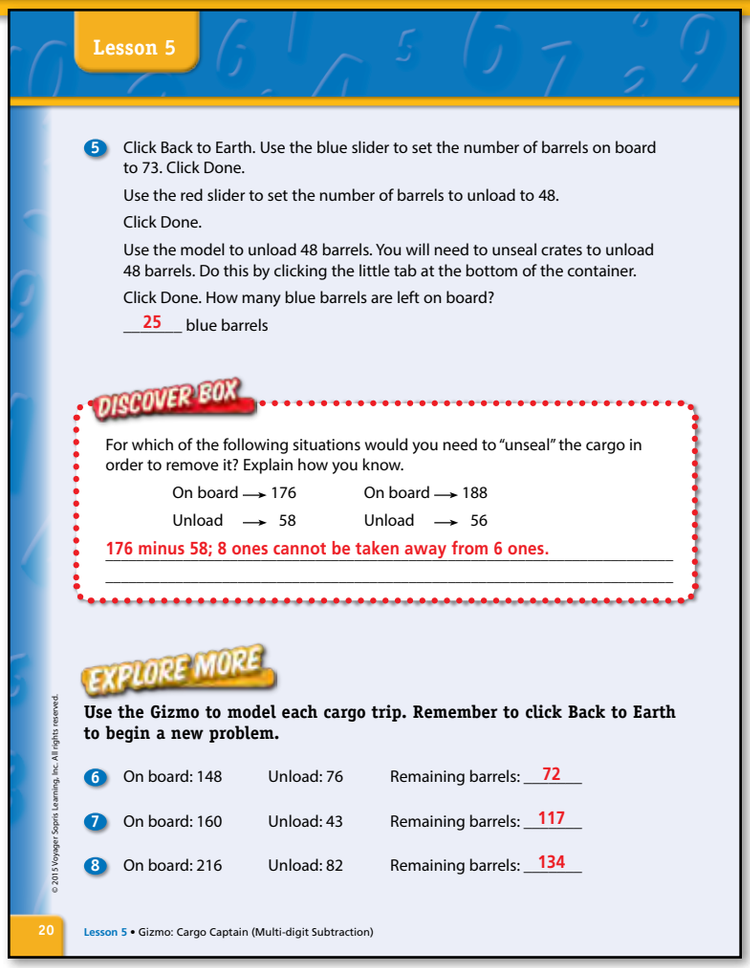
How many hundreds and how many tens are in 420? (4 hundreds and 2 tens) **How many total tens are in 420?** (42 tens)

DISCOVER

Problem 4

Have students log in to the Cargo Captain (Multi-digit Subtraction) Gizmo using the instructions in the box. Orient them to the Gizmo by reading aloud the description: **You are the captain of an interplanetary cargo ship, delivering important supplies to the outer planets. The cargo can be stored in barrels, crates, and holds. There are 10 barrels in a crate, and 10 crates in a hold. Model multi-digit subtraction by unloading cargo on each planet.**

The cargo ship needs to deliver 138 barrels from Earth to another planet. Use the blue slider to set the number of barrels on board the ship. Slide the knob to show 138 in the display box. Click Done.



Lesson 5

5 Click Back to Earth. Use the blue slider to set the number of barrels on board to 73. Click Done.

Use the red slider to set the number of barrels to unload to 48.

Click Done.

Use the model to unload 48 barrels. You will need to unseal crates to unload 48 barrels. Do this by clicking the little tab at the bottom of the container.

Click Done. How many blue barrels are left on board?

25 blue barrels

DISCOVER BOX

For which of the following situations would you need to "unseal" the cargo in order to remove it? Explain how you know.

On board → 176 Unload → 58

On board → 188 Unload → 56

176 minus 58; 8 ones cannot be taken away from 6 ones.

EXPLORE MORE

Use the Gizmo to model each cargo trip. Remember to click Back to Earth to begin a new problem.

6 On board: 148 Unload: 76 Remaining barrels: 72

7 On board: 160 Unload: 43 Remaining barrels: 117

8 On board: 216 Unload: 82 Remaining barrels: 134

20 Lesson 5 • Gizmo: Cargo Captain (Multi-digit Subtraction)

The cargo is sealed before flight. Ten barrels are grouped together to create 1 crate. Ten crates are grouped together to create 1 hold. How was the cargo organized and sealed for this flight? (1 hold, 3 crates, 8 barrels)

The ship flew from Earth to Pythagoras. On Pythagoras, 25 barrels need to be unloaded. Use the red slider to set the number of barrels to unload from the ship. Slide the knob to show 25 in the display box. Click Done.

Click on the crates and barrels to unload 25 barrels from the ship. As they are unloaded, their color changes to red. Click until 25 barrels are unloaded and the number 25 is shown in red.

How many total crates were unloaded? (2) **How many single barrels were unloaded?** (5)

Click Done. How many total blue barrels are left on board? (113 blue barrels)

Problem 5

For problem 5, click Back to Earth. Use the blue slider to set the number of barrels on board to 73. Click Done.

Use the red slider to set the number of barrels to unload to 48. Click Done.

You will use the model to unload 48 barrels. Because 8 single barrels cannot be unloaded from the 3 single barrels shown, you need to unseal crates. Do this by clicking the little tab at the bottom of the crate.

How many sealed crates should be clicked to unload 48 barrels? (4) **How many crates and how many barrels need to be unloaded?** (4 crates and 8 barrels)

Unload 48 barrels. Count the number of blue barrels left on board. How many blue barrels remain? (25 blue barrels)

Click Done. Check the display. How many total blue barrels are left on board? (25 blue barrels)

DISCOVER BOX

Look at problems 4 and 5, which you have just completed, and think about when it was necessary to unseal the cargo. For which of the following situations would you need to "unseal" the cargo in order to remove it? (176 minus 58)

How do you know? (8 ones cannot be taken away from 6 ones)

EXPLORE MORE

Problems 6–8

Have students work individually. Remind them that they can type in the number of barrels as well as use the slider to put in the number of barrels on board. Also remind students to click Back to Earth between problems.

Extension: Have students or partners create problems for each other that involve subtracting with and without regrouping.

Lesson 6

Objective

To subtract 3-digit whole numbers with 2 regroupings

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

This problem already has been written vertically. Subtract one column at a time starting with the ones place. What is the difference of 339 and 207? (132)

Problem 2

This problem already has been written vertically. Can the digits in the ones column be subtracted? (no) **Why not?** (The top digit is less than the bottom digit.)

Take one of the tens from the tens column and add 10 ones to the ones column. How many tens are in 685? (8) **Cross out the 8 in the tens column and write 7 above it. Cross out the 5 in the ones column and write 15 above it.**

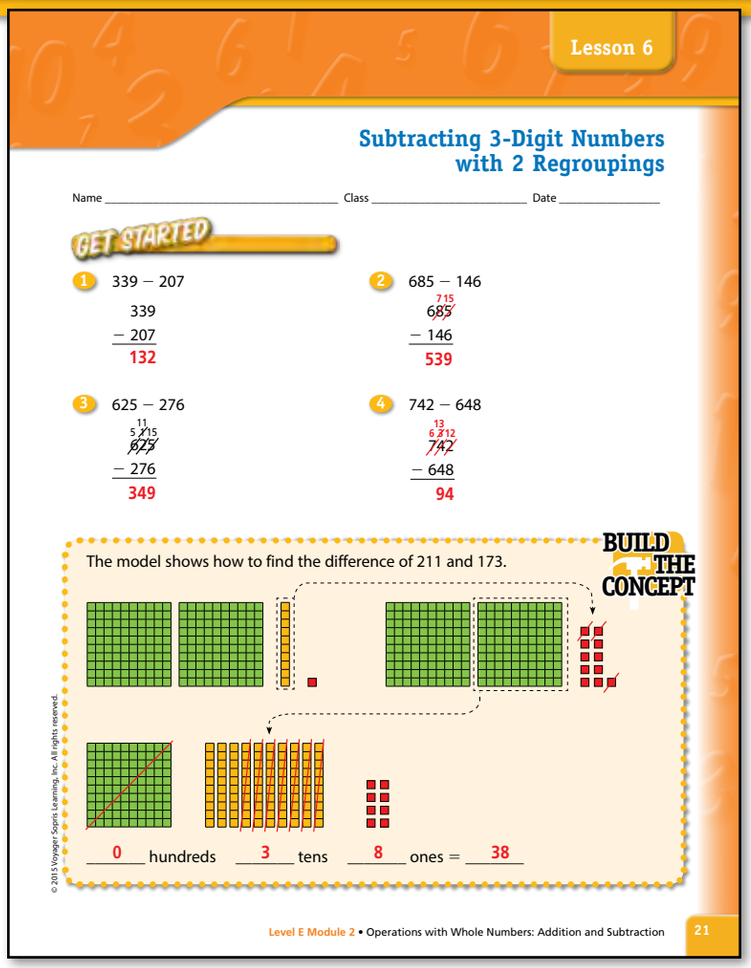
Now, subtract one column at a time. What is the difference of 685 and 146? (539)

MODEL NEW SKILLS

Problem 3

In this problem, two regroupings will be needed. Look at the ones column. Can 6 ones be subtracted from 5 ones? (no) **How many tens are there in 625?** (2) **The crossed-out 2 in the tens column shows that 1 ten was taken away, and the 1 above it shows how many tens are left. What is 10 plus 5?** (15) **The 15 above the crossed-out 5 shows that there are 15 ones after regrouping.**

What is 15 minus 6? (9) **How many tens remain in the top number?** (1) **Can 7 tens be subtracted from 1 ten?** (no) **Because the top number has fewer tens, it will have to be regrouped to continue subtracting. Regroup 1 hundred as 10 tens. How many hundreds are in the top number?** (6)



Lesson 6

Subtracting 3-Digit Numbers with 2 Regroupings

Name _____ Class _____ Date _____

GET STARTED

1. 339 − 207

339
− 207
132

2. 685 − 146

7 15
6 8 5
− 146
539

3. 625 − 276

11
5 2 15
6 2 5
− 276
349

4. 742 − 648

13
6 3 12
7 4 2
− 648
94

BUILD THE CONCEPT

The model shows how to find the difference of 211 and 173.

0 hundreds 3 tens 8 ones = 38

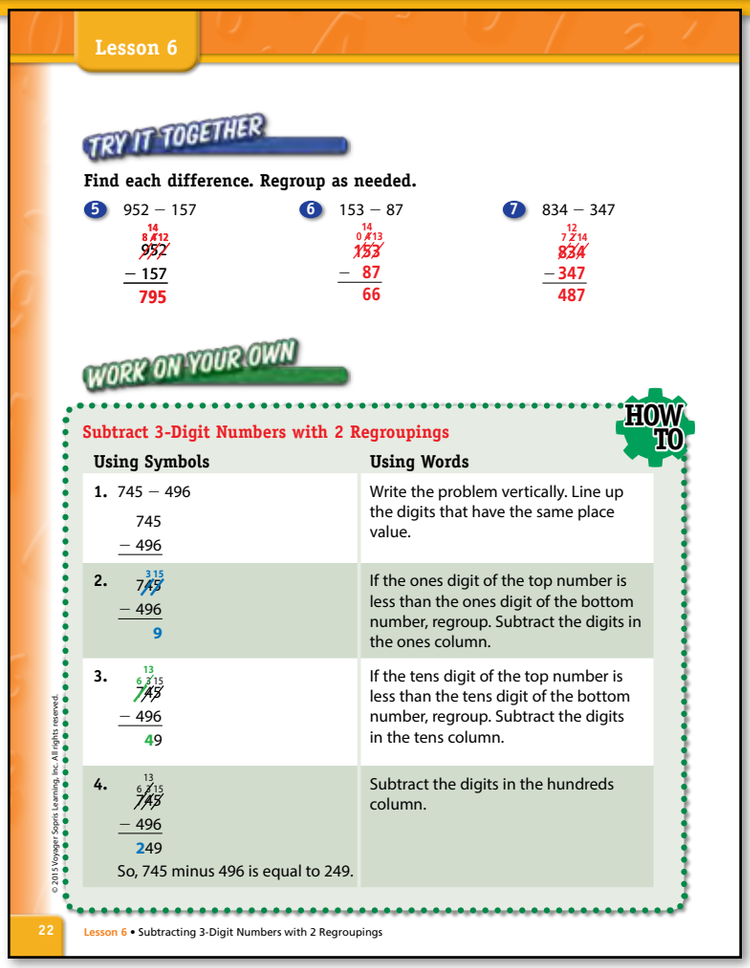
Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 21

If 1 hundred is taken from 6 hundreds, how many hundreds are left? (5) **The crossed-out 6 in the hundreds column shows that 1 hundred was taken, and the 5 above it shows how many hundreds are left. What is 10 plus 1?** (11) **The crossed-out 1 above the tens column with the 11 above it shows that there are now 11 tens.**

What is 11 minus 7? (4) **Now subtract the hundreds column. What is 5 minus 2?** (3) **What is the difference of 625 and 276?** (349)

Problem 4

Can the digits in the ones column be subtracted? (no) **Regroup 1 ten as 10 ones. How many tens are in the top number?** (4) **How many tens are left after regrouping?** (3) **Cross out the 4 and write 3 above it. Add 10 ones to the 2 in the ones column. Write 12 above the ones column. How many ones are in the top number after regrouping?** (12) **What is 12 minus 8?** (4) **Can the digits in the tens column be subtracted?** (no) **Regroup 1 hundred as 10 tens. Cross out the 7 and write 6 above it. Add 10 tens to the 3 tens by crossing out the 3 and writing 13 above it in the tens column. How many tens are in the top number now?** (13) **What is 13 minus 4?** (9)



Lesson 6

TRY IT TOGETHER

Find each difference. Regroup as needed.

5 952 − 157

$$\begin{array}{r} {}^{14}\not{8}\not{5}{}^{12}\not{2} \\ -\ 157 \\ \hline 795 \end{array}$$

6 153 − 87

$$\begin{array}{r} {}^{14}\not{0}\not{5}{}^{13}\not{3} \\ -\ 87 \\ \hline 66 \end{array}$$

7 834 − 347

$$\begin{array}{r} {}^{12}\not{7}\not{3}{}^{14}\not{4} \\ -\ 347 \\ \hline 487 \end{array}$$

WORK ON YOUR OWN

HOW TO

Subtract 3-Digit Numbers with 2 Regroupings

Using Symbols	Using Words
1. 745 − 496 745 − 496	Write the problem vertically. Line up the digits that have the same place value.
2. $\begin{array}{r} 7\not{4}{}^{3}\not{5} \\ -\ 496 \\ \hline 9 \end{array}$	If the ones digit of the top number is less than the ones digit of the bottom number, regroup. Subtract the digits in the ones column.
3. $\begin{array}{r} {}^{13}6\not{7}{}^{15}\not{5} \\ -\ 496 \\ \hline 49 \end{array}$	If the tens digit of the top number is less than the tens digit of the bottom number, regroup. Subtract the digits in the tens column.
4. $\begin{array}{r} {}^{13}6\not{7}{}^{15}\not{5} \\ -\ 496 \\ \hline 249 \end{array}$ So, 745 minus 496 is equal to 249.	Subtract the digits in the hundreds column.

22 Lesson 6 • Subtracting 3-Digit Numbers with 2 Regroupings

Last, subtract the digits in the hundreds column. What is 6 minus 6? (0) **It is not necessary to write zeros in front of a number. What is the difference of 742 and 648?** (94)

BUILD THE CONCEPT

Model how to subtract 3-digit whole numbers with 2 regroupings using base-10 pieces.

Base-10 pieces can be used to subtract whole numbers with 2 regroupings. The subtraction problem is 211 minus 173. The first model shows the number 211. How many hundreds flats are there in 211? (2) **How many tens rods are there in 211?** (1) **How many ones blocks are there in 211?** (1)

What number is to be subtracted from 211? (173) **How many ones blocks should be taken away to subtract 173?** (3) **Are there 3 ones blocks in the model of 211?** (no) **So, the tens rod must be regrouped to make 10 ones blocks. The second model shows the regrouping.**

How many ones blocks are there now in the second model after regrouping 1 tens rod? (11) **Can 3 ones be taken away now?** (yes) **Cross out 3 of the ones blocks to show 3 being taken away. How many ones blocks are left?** (8) **Now, how many tens rods are left after regrouping?** (0) **How many tens rods should be taken away to subtract 173?** (7) **Can 7 tens rods be taken away from 0?** (no) **So, a hundreds flat must be regrouped to make 10 tens rods. This is shown in the third model.**

How many tens rods are there now are after regrouping? (10) **How many should be taken away to subtract 173?** (7) **Cross out 7 of the tens rods to show 7 being taken away. How many tens rods are left after subtracting?** (3) **How many hundreds flats are left after regrouping?** (1) **How many hundreds flats should be taken away to subtract 173?** (1) **Can 1 be taken away?** (yes) **Cross out the hundreds flat. How many hundreds flats are left?** (0) **What is the difference of 211 and 173?** (38)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

Can 7 ones be subtracted from 2 ones? (no) **Regroup 1 ten as 10 ones. How many tens are left?** (4) **How many ones are there now?** (12) **What is 12 minus 7?** (5)

Can the digits in the tens column be subtracted? (no) **Regroup 1 hundred as 10 tens. How many hundreds are left?** (8) **How many tens are there now?** (14) **What is 14 minus 5?** (9) **Subtract the digits in the hundreds column. What is 8 minus 1?** (7) **What is the difference of 952 and 157?** (795)

Problem 6

First, write the problem vertically. Can the digits in the ones column be subtracted? (no) **Regroup and subtract the ones column. What is 13 minus 7?** (6)

Can the digits in the tens column be subtracted? (no) **Regroup. What is 14 minus 8?** (6) **How many hundreds are left in the top number?** (0) **There are no hundreds in the bottom number. What is the difference of 153 and 87?** (66)

Problem 7

First, write the problem vertically. Can the ones column be subtracted without regrouping? (no) **Regroup. Can the tens column be subtracted?** (no) **Regroup. What is the difference of 834 and 347?** (487)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 8–23

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problems 12, 14, 20, and 23 **Reminder**

Review with students that zeros should not be written at the front of a whole-number answer.

CHECK UP

ASSESS INFORMALLY

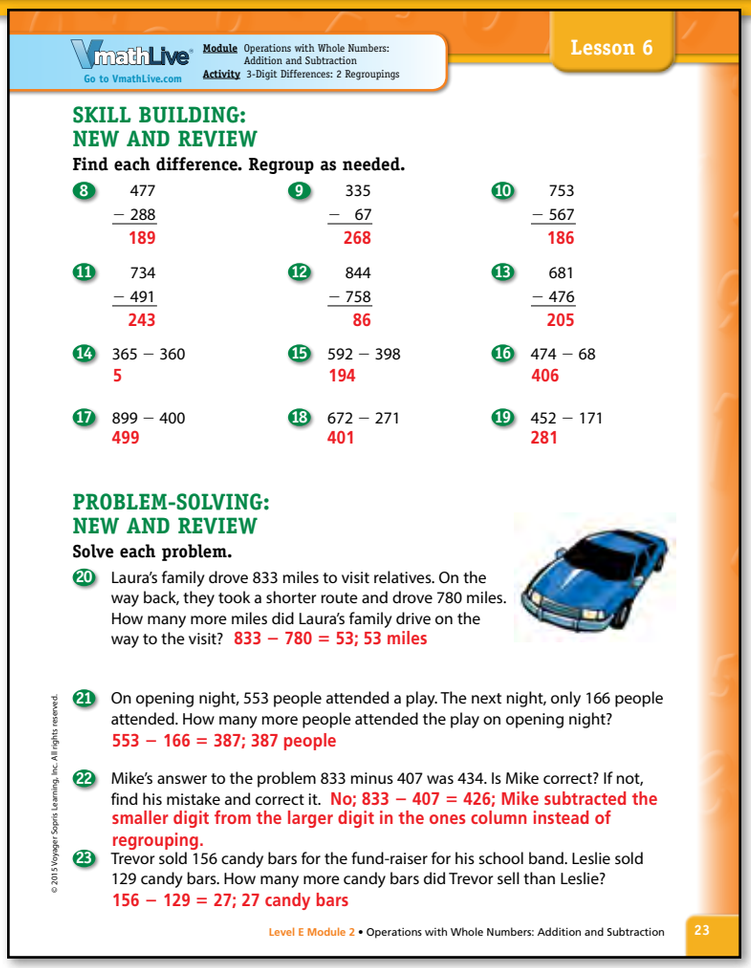
Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1b: The student gave an estimated answer. Remind the student to give exact answers unless an estimate is asked for.

If student answered 1c or 2a: The student subtracted the smaller digit from the larger digit instead of regrouping. Use Additional Resources in E.2.6 to review how to subtract with 2 regroupings.

If student answered 1d or 2d: The student added to the ones or tens but did not take away from the tens or hundreds. Use Additional Resources in E.2.6 to reteach how to subtract 3-digit numbers with 2 regroupings.



VmathLive Go to VmathLive.com
Module Operations with Whole Numbers: Addition and Subtraction
Activity 3-Digit Differences: 2 Regroupings

Lesson 6

SKILL BUILDING: NEW AND REVIEW

Find each difference. Regroup as needed.

8. 477 − 288 = 189
9. 335 − 67 = 268
10. 753 − 567 = 186
11. 734 − 491 = 243
12. 844 − 758 = 86
13. 681 − 476 = 205
14. 365 − 360 = 5
15. 592 − 398 = 194
16. 474 − 68 = 406
17. 899 − 400 = 499
18. 672 − 271 = 401
19. 452 − 171 = 281

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

20. Laura's family drove 833 miles to visit relatives. On the way back, they took a shorter route and drove 780 miles. How many more miles did Laura's family drive on the way to the visit? 833 − 780 = 53; 53 miles

21. On opening night, 553 people attended a play. The next night, only 166 people attended. How many more people attended the play on opening night? 553 − 166 = 387; 387 people

22. Mike's answer to the problem 833 minus 407 was 434. Is Mike correct? If not, find his mistake and correct it. No; 833 − 407 = 426; Mike subtracted the smaller digit from the larger digit in the ones column instead of regrouping.

23. Trevor sold 156 candy bars for the fund-raiser for his school band. Leslie sold 129 candy bars. How many more candy bars did Trevor sell than Leslie? 156 − 129 = 27; 27 candy bars

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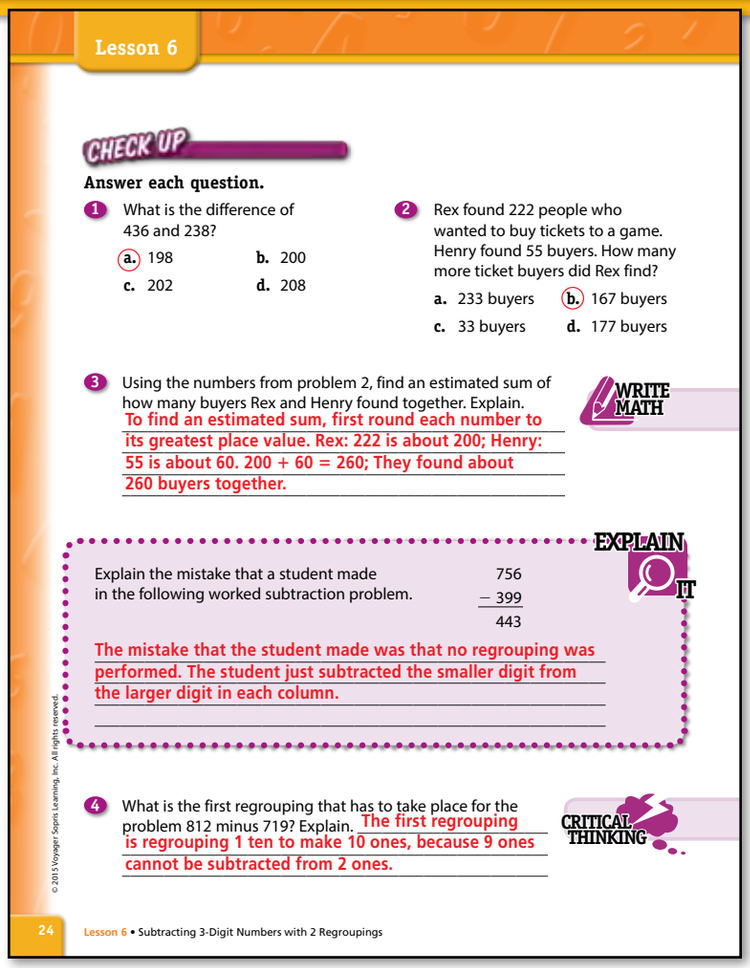
WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student how to round a number to its greatest place value, then add. This will help find the estimated sum.

EXPLAIN IT

As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.



Lesson 6

CHECK UP

Answer each question.

1. What is the difference of 436 and 238?
   a. 198 **b.** 200
   c. 202 **d.** 208

2. Rex found 222 people who wanted to buy tickets to a game. Henry found 55 buyers. How many more ticket buyers did Rex find?
   a. 233 buyers **b.** 167 buyers
   c. 33 buyers **d.** 177 buyers

3. Using the numbers from problem 2, find an estimated sum of how many buyers Rex and Henry found together. Explain.
   To find an estimated sum, first round each number to its greatest place value. Rex: 222 is about 200; Henry: 55 is about 60. 200 + 60 = 260; They found about 260 buyers together.

WRITE MATH

EXPLAIN IT

Explain the mistake that a student made in the following worked subtraction problem.

$$\begin{array}{r} 756 \\ -\ 399 \\ \hline 443 \end{array}$$

The mistake that the student made was that no regrouping was performed. The student just subtracted the smaller digit from the larger digit in each column.

4. What is the first regrouping that has to take place for the problem 812 minus 719? Explain.
   The first regrouping is regrouping 1 ten to make 10 ones, because 9 ones cannot be subtracted from 2 ones.

CRITICAL THINKING

DIFFERENTIATION

Additional Resources

VmathLive

Module: Operations with Whole Numbers: Addition and Subtraction

Activity: 3-Digit Differences: 2 Regroupings

Vmath Reteach

Reteach Student Module 2 Lesson 6

Reteach Teacher Module 2 Lesson 6

Extra Practice

Student Book page 42

English Language Learners

Have students create a checklist by writing the **HOW TO** steps on an index card. Tell students that they can use this checklist as they solve subtraction problems. Ask students whether there are any words on the index card that they do not completely understand. Have students underline these words. Match students with partners to review underlined words. Review vocabulary as a class. Model the checklist strategy by writing *324 − 189* on the board. Have a student read the first step. Tell students to write the problem vertically on their paper, then check off the first step. Have a student read the second step. Have students regroup the ones, then check off the second step. Continue having students read each step aloud, follow the instructions, then check off the step.

Students with Special Needs

Pair students and give them a set of base-10 pieces, a sheet of paper, and the **HOW TO** steps. Write *312 − 184* on the board. Have one student in the pair solve the problem with base-10 pieces. As the students are solving, they should explain to their partners what they are doing. The second student should solve the problem on paper following the steps as given by the partner. Have students compare answers and discuss any differences. Have students switch roles and solve a new problem.

Lesson 7

Objective

To subtract 3-digit whole numbers with zeros

Preskills	Lesson
Subtracting 3-Digit Numbers with 2 Regroupings	E.2.6

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

To subtract, begin with the ones column. Regroup 1 ten as 10 ones. Cross out the 8 in the tens column and write 7 above it. Now, add the 10 ones to the 1 in the ones column. To show there are now 11 ones, cross out the 1 in the ones column, and write 11 above it. What is 11 minus 8? (3) **Write 3 under the equal bar in the ones column.**

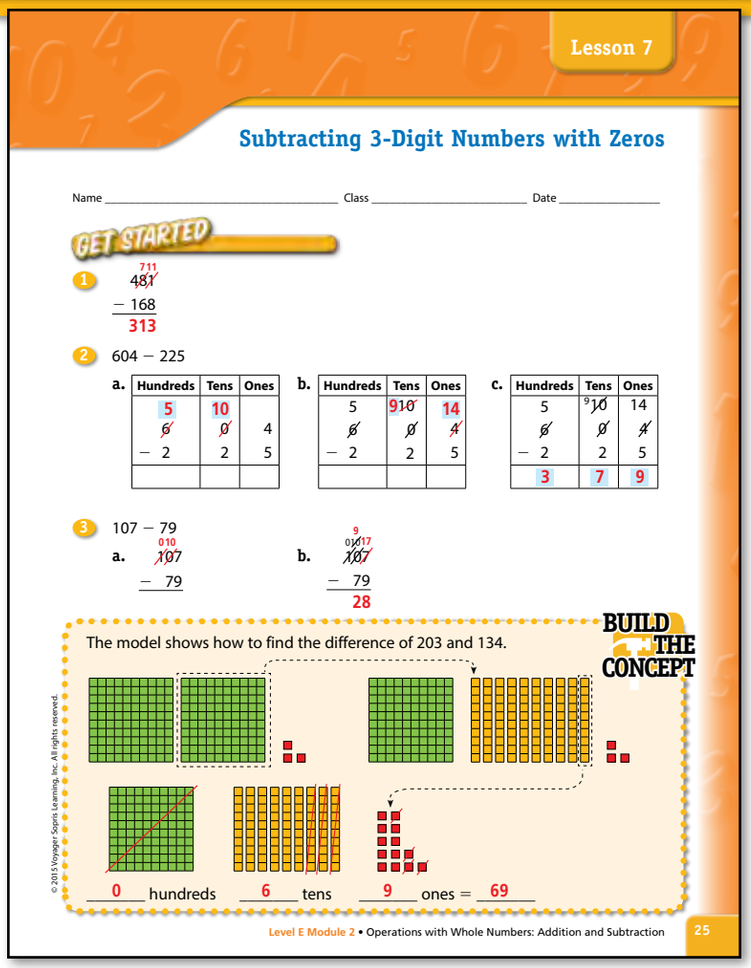
Can the digits in the tens column be subtracted? (yes) **What is 7 minus 6?** (1) **Subtract the digits in the hundreds column. What is 4 minus 1?** (3) **Write 3 under the equal bar in the hundreds column. What is the difference of 481 and 168?** (313)

MODEL NEW SKILLS

Problem 2

Look at problem 2a. Begin with the ones column. Can 5 ones be subtracted from 4 ones? (no) **Regrouping is necessary. Look at the tens column. How many tens are in the top number?** (0) **Because the tens digit is 0, there are no tens to regroup.**

Look at the hundreds column. How many hundreds are in the top number? (6) **Six hundreds is the same as 5 hundreds and 10 tens. Cross out the 6 in the hundreds column and write 5 above it. Now, cross out the 0 in the tens column and write 10 above it.**



Lesson 7

Subtracting 3-Digit Numbers with Zeros

Name _____ Class _____ Date _____

GET STARTED

1 481 − 168 = 313

2 604 − 225

a.	Hundreds	Tens	Ones
	5	10	
	6	0	4
−	2	2	5

b.	Hundreds	Tens	Ones
	5	9 10	14
	6	0	4
−	2	2	5

c.	Hundreds	Tens	Ones
	5	9 10	14
	6	0	4
−	2	2	5
	3	7	9

3 107 − 79

a. 107 − 79 = 28

b. 107 − 79 = 28

BUILD THE CONCEPT

The model shows how to find the difference of 203 and 134.

0 hundreds 6 tens 9 ones = 69

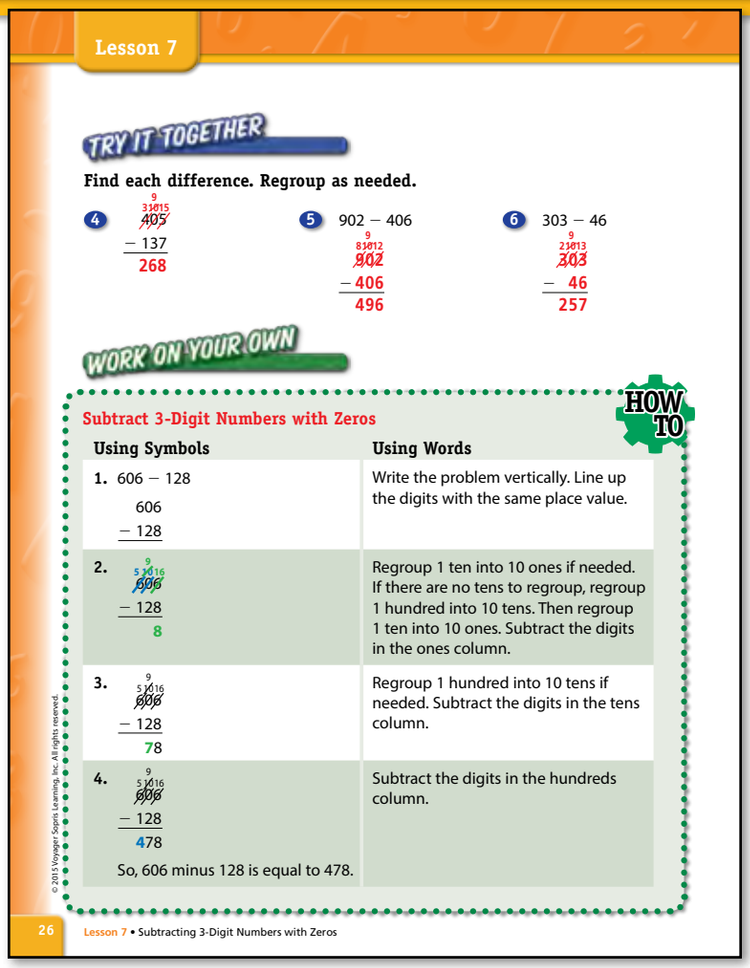
Look at problem 2b. There are now 5 hundreds in the hundreds column, 10 tens in the tens column, and 4 ones in the ones column. Can the tens column be regrouped into ones now? (yes) **Cross out the 10 in the tens column and write 9 above it. Add the 10 ones to the 4 already in the ones column. Cross out the 4 in the ones column and write 14 above it.**

Look at problem 2c. Now, subtract the numbers in the ones column. What is 14 minus 5? (9) **Next, subtract the digits in the tens column. What is 9 minus 2?** (7) **Last, subtract the digits in the hundreds column. What is 5 minus 2?** (3) **What is the difference of 604 and 225?** (379)

Problem 3

Can 9 ones be subtracted from 7 ones? (no) **Regrouping is necessary. How many tens are in the top number?** (0) **What should be done when there are no tens to regroup?** (Move to the hundreds column and regroup.)

How many hundreds are in this number? (1) **Cross out the 1 in the hundreds column and write 0 above it. Cross out the 0 in the tens column and write 10 above it.**



Lesson 7

TRY IT TOGETHER

Find each difference. Regroup as needed.

4 $\begin{array}{r} {\scriptstyle 9}\\ 3\not{0}{\scriptstyle 1}\not{5}\\ \not{4}\not{0}\not{5}\\ -\ 137\\ \hline 268 \end{array}$

5 902 − 406

$\begin{array}{r} {\scriptstyle 9}\\ 8\not{0}{\scriptstyle 1}2\\ \not{9}\not{0}\not{2}\\ -\ 406\\ \hline 496 \end{array}$

6 303 − 46

$\begin{array}{r} {\scriptstyle 9}\\ 2\not{9}{\scriptstyle 1}3\\ \not{3}\not{0}\not{3}\\ -\ 46\\ \hline 257 \end{array}$

WORK ON YOUR OWN

HOW TO

Subtract 3-Digit Numbers with Zeros

Using Symbols	Using Words
1. 606 − 128 606 − 128	Write the problem vertically. Line up the digits with the same place value.
2. $\begin{array}{r} {\scriptstyle 9}\\ 5\not{0}{\scriptstyle 1}6\\ \not{6}\not{0}\not{6}\\ -\ 128\\ \hline 8 \end{array}$	Regroup 1 ten into 10 ones if needed. If there are no tens to regroup, regroup 1 hundred into 10 tens. Then regroup 1 ten into 10 ones. Subtract the digits in the ones column.
3. $\begin{array}{r} {\scriptstyle 9}\\ 5\not{0}{\scriptstyle 1}6\\ \not{6}\not{0}\not{6}\\ -\ 128\\ \hline 78 \end{array}$	Regroup 1 hundred into 10 tens if needed. Subtract the digits in the tens column.
4. $\begin{array}{r} {\scriptstyle 9}\\ 5\not{0}{\scriptstyle 1}6\\ \not{6}\not{0}\not{6}\\ -\ 128\\ \hline 478 \end{array}$ So, 606 minus 128 is equal to 478.	Subtract the digits in the hundreds column.

26 Lesson 7 • Subtracting 3-Digit Numbers with Zeros

Look at problem 3b. Can the tens column be regrouped into ones? (yes) **Cross out the 10 in the tens column and write 9 above it. Cross out the 7 in the ones column and write 17 above it. What is 17 minus 9?** (8) **Write 8 in the ones column under the equal bar.**

Next, subtract the tens column. What is 9 minus 7? (2) **Write 2 under the equal bar in the tens column. There are no hundreds in the hundreds column, so the subtraction is complete. What is the difference of 107 and 79?** (28)

BUILD THE CONCEPT

Model how to subtract 3-digit whole numbers with zeros using base-10 pieces.

Base-10 pieces can be used to subtract whole numbers with zeros. The subtraction problem is 203 minus 134. The first model shows the number 203. How many hundreds flats are there in 203? (2) **How many tens rods are there in 203?** (0) **How many ones blocks are there in 203?** (3)

What number is to be subtracted from 203? (134) **How many ones blocks should be taken away to subtract 134?** (4) **Are there 4 ones blocks in the model of 203?** (no) **So, a tens rod must be regrouped to make 10 ones blocks. Is there a tens rod to regroup?** (no) **So, to regroup a tens rod, first a hundreds flat must regrouped to 10 tens rods. This is shown in the second model.**

How many tens rods are there in the second model after regrouping? (10) **Four ones still cannot be subtracted from the second model. What needs to be done now?** (Regroup a tens rod.) **This is shown in the third model. How many ones blocks are there now after regrouping?** (13) **Can 4 ones blocks be taken away now?** (yes) **Cross out 4 ones blocks to show 4 being taken away. How many ones are left?** (9)

How many tens rods are there now after regrouping? (9) **How many should be taken away to subtract 134?** (3) **Cross out 3 tens rods to show 3 being taken away. How many tens rods are left after subtracting?** (6) **How many hundreds flats are left after regrouping?** (1) **How many hundreds flats should be taken away to subtract 134?** (1) **Can 1 be taken away?** (yes) **Cross out the hundreds flat. How many hundreds flats are left?** (0) **What is the difference of 203 and 134?** (69)

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 4

Can the digits in the ones column be subtracted? (no) **Can 1 ten be regrouped from the tens digit?** (no) **Why not?** (The tens digit is 0.) **What should be done next?** (Move to the hundreds column and regroup.)

What digit is in the hundreds column? (4) **How can 4 hundreds be regrouped?** (3 hundreds and 10 tens) **Cross out the 4 in the hundreds column and write 3 above it. Cross out the 0 in the tens column and write 10 above it.**

What is the next step? (Regroup 1 ten as 10 ones.) **Cross out the 10 in the tens column and write 9 above it. Cross out the 5 in the ones column and write 15 above it.**

Subtract the numbers in the ones column. What is 15 minus 7? (8) **Subtract the digits in the tens column. What is 9 minus 3?** (6) **Subtract the digits in the hundreds column. What is 3 minus 1?** (2) **What is the difference of 405 and 137?** (268)

Problem 5

What is the first step in solving this problem? (Rewrite the problem vertically.) **Can 1 ten be regrouped from the tens digit?** (no) **What should be done next?** (Move to the hundreds column and regroup.) **How many hundreds are in the top number?** (9) **How can 9 hundreds be regrouped?** (8 hundreds and 10 tens) **How can 10 tens be regrouped?** (9 tens and 10 ones) **What is the difference of 902 and 406?** (496)

Problem 6

What is the first step in solving this problem? (Rewrite the problem vertically.) **Will it be necessary to regroup?** (yes) **Regroup, then subtract. What is the difference of 303 and 46?** (257)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING This problem illustrates the **Using a 4-Step Plan** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem. The instruction is immediately followed by application of the strategy in problems 16 and 17.

Have students read the problem.

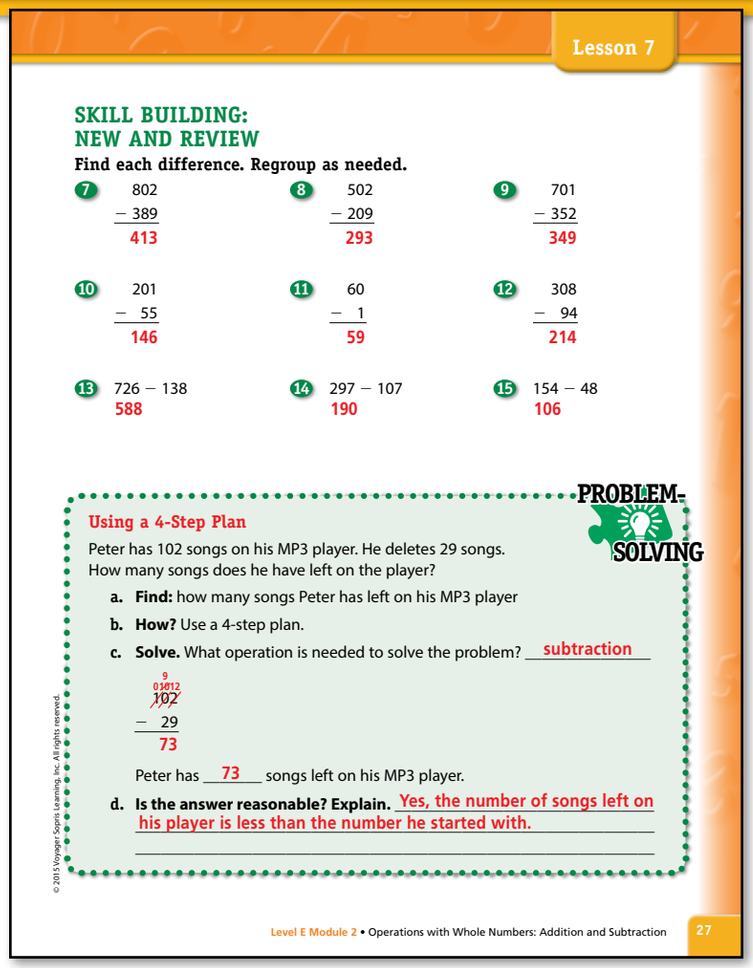
Review the 4-step plan with students:

Step 1 is to determine what needs to be found.
Step 2 is to determine how the problem will be solved.
Step 3 is to solve the problem.
Step 4 is to check the answer for reasonableness.

Students should then solve the subtraction problem. Be sure that students regroup carefully:

$$\begin{array}{r} {\scriptstyle 9\ \ 0\ 12} \\ 1\not{0}\not{2} \\ -\ 29 \\ \hline 73 \end{array}$$

Have students look at the difference and compare it with the original number of songs. The difference is less than the original number of songs, so the answer is reasonable.



Lesson 7

SKILL BUILDING: NEW AND REVIEW

Find each difference. Regroup as needed.

7	802 − 389 = 413	8	502 − 209 = 293
9	701 − 352 = 349	10	201 − 55 = 146
11	60 − 1 = 59	12	308 − 94 = 214
13	726 − 138 = 588	14	297 − 107 = 190
15	154 − 48 = 106		

PROBLEM-SOLVING

Using a 4-Step Plan

Peter has 102 songs on his MP3 player. He deletes 29 songs. How many songs does he have left on the player?

a. **Find:** how many songs Peter has left on his MP3 player

b. **How?** Use a 4-step plan.

c. **Solve.** What operation is needed to solve the problem? subtraction

$$\begin{array}{r} {\scriptstyle 9\ \ 0\ 12} \\ 1\not{0}\not{2} \\ -\ 29 \\ \hline 73 \end{array}$$

Peter has 73 songs left on his MP3 player.

d. **Is the answer reasonable? Explain.** Yes, the number of songs left on his player is less than the number he started with.

Problems 7–19

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problem 19 Reminder

Remind students that this is a 2-step problem.

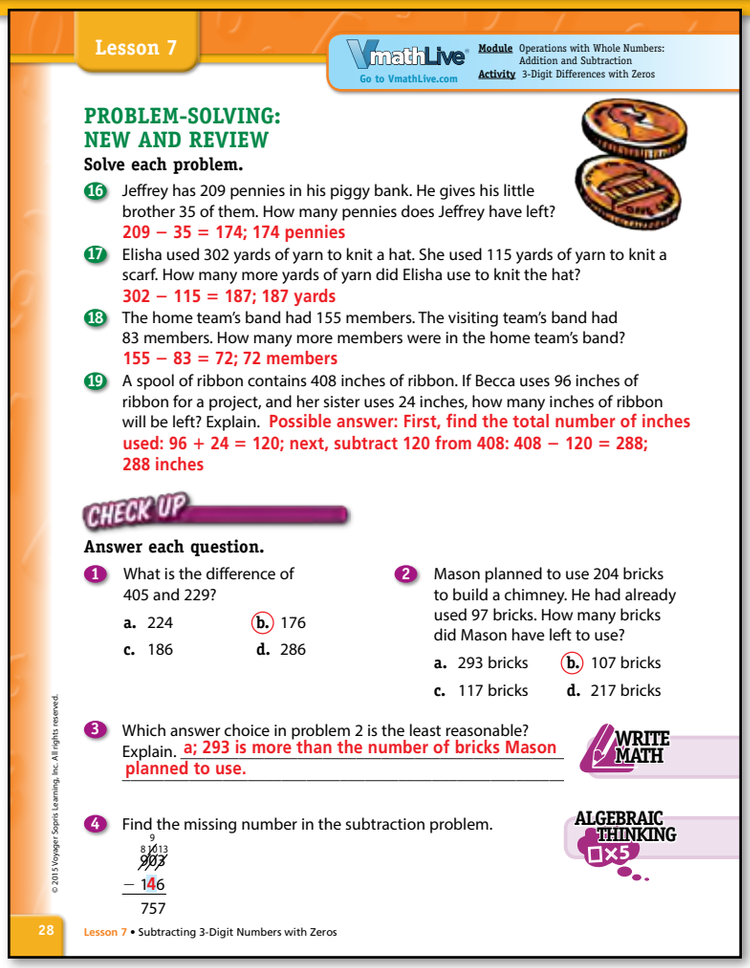
CHECK UP

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a or 2a: The student subtracted the smaller digit from the larger number instead of regrouping. Use Additional Resources in E.2.7 to reteach how to subtract 3-digit numbers with zeros.



Lesson 7

VmathLive Go to VmathLive.com
Module Operations with Whole Numbers: Addition and Subtraction
Activity 3-Digit Differences with Zeros

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

16 Jeffrey has 209 pennies in his piggy bank. He gives his little brother 35 of them. How many pennies does Jeffrey have left?
209 − 35 = 174; 174 pennies

17 Elisha used 302 yards of yarn to knit a hat. She used 115 yards of yarn to knit a scarf. How many more yards of yarn did Elisha use to knit the hat?
302 − 115 = 187; 187 yards

18 The home team's band had 155 members. The visiting team's band had 83 members. How many more members were in the home team's band?
155 − 83 = 72; 72 members

19 A spool of ribbon contains 408 inches of ribbon. If Becca uses 96 inches of ribbon for a project, and her sister uses 24 inches, how many inches of ribbon will be left? Explain. Possible answer: First, find the total number of inches used: 96 + 24 = 120; next, subtract 120 from 408: 408 − 120 = 288; 288 inches

CHECK UP

Answer each question.

1 What is the difference of 405 and 229?
a. 224 (b.) 176
c. 186 d. 286

2 Mason planned to use 204 bricks to build a chimney. He had already used 97 bricks. How many bricks did Mason have left to use?
a. 293 bricks (b.) 107 bricks
c. 117 bricks d. 217 bricks

3 Which answer choice in problem 2 is the least reasonable? Explain. a; 293 is more than the number of bricks Mason planned to use.

WRITE MATH

4 Find the missing number in the subtraction problem.

ALGEBRAIC THINKING

$$\begin{array}{r} {}^{9}\cancel{8}\,{}^{1}\cancel{0}{}^{1}3 \\ -\ 1\square 6 \\ \hline 757 \end{array}$$

□ × 5

28 Lesson 7 • Subtracting 3-Digit Numbers with Zeros

If student answered 1d or 2d: The student added to the ones or tens but did not take away from the tens or hundreds. Use Additional Resources in E.2.7 to reteach how to subtract 3-digit numbers with zeros.

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student that in a subtraction problem, the difference should be less than the larger of the two numbers in the problem.

DIFFERENTIATION

Additional Resources

VmathLive

Module: Operations with Whole Numbers: Addition and Subtraction

Activity: 3-Digit Differences with Zeros

Vmath Reteach

Reteach Student Module 2 Lesson 7

Reteach Teacher Module 2 Lesson 7

Extra Practice

Student Book page 43

English Language Learners

Remind students that when they regroup, they are creating equal amounts. Give students 14 ones, then have them regroup the ones into 1 ten and 4 ones. Help students see that the value of 14 ones and the value of 1 ten and 4 ones are equal. Give students 2 hundreds, then have students regroup the hundreds into 1 hundred and 10 tens. Help students see that the value of 2 hundreds and the value of 1 hundred and 10 tens are equal. Continue the activity with regrouping of 3-digit numbers with zeros.

Students with Special Needs

Create a set of cards with 3-digit numbers with a zero in the tens place. Pair students and give them the number cards and base-10 pieces. Have one partner model the number with the base-10 pieces.

Have the second partner regroup 1 hundred for 10 tens. Have the partners discuss why they must regroup 1 hundred when they are subtracting a number with a zero in the tens place. Have students switch roles and choose a new number card. Students should alternate roles until they have shown all of the numbers.

Lesson 8

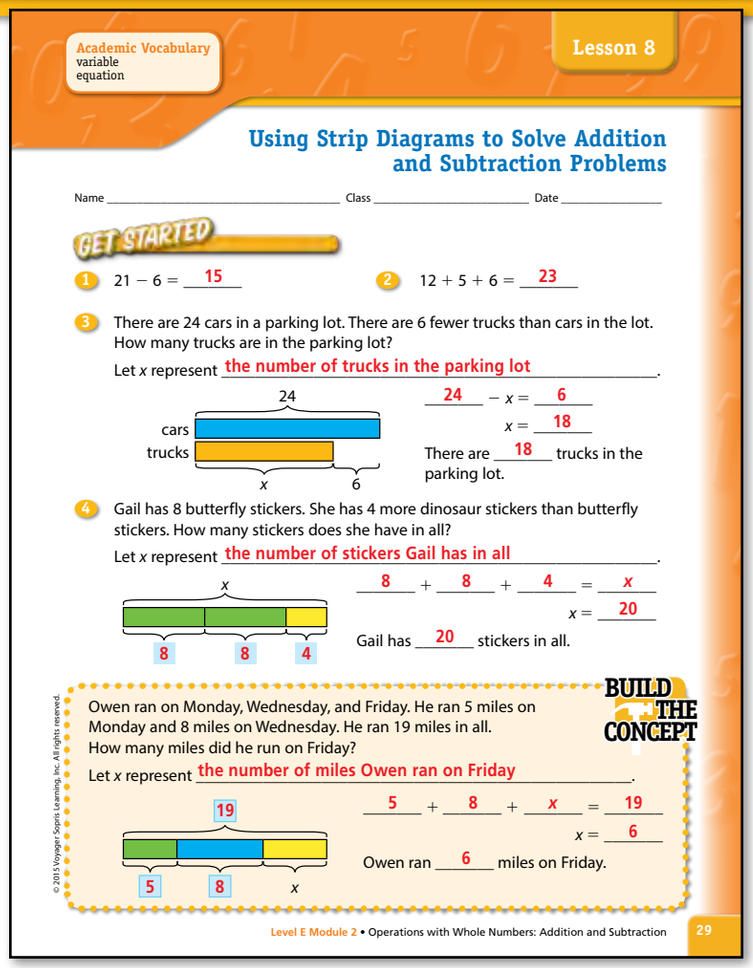
Objective

To use a variable and a strip diagram to solve addition and subtraction problems

Academic Vocabulary

Before the lesson, introduce and discuss the Academic Vocabulary. Refer to the Academic Vocabulary as needed during the lesson.

- **variable**
  a letter or symbol that represents a number
- **equation**
  a mathematical sentence that uses an equal sign


Academic Vocabulary
variable
equation

Lesson 8

Using Strip Diagrams to Solve Addition and Subtraction Problems

Name _____ Class _____ Date _____

GET STARTED

1. 21 − 6 = 15
2. 12 + 5 + 6 = 23

3. There are 24 cars in a parking lot. There are 6 fewer trucks than cars in the lot. How many trucks are in the parking lot?
Let *x* represent the number of trucks in the parking lot.

24 − *x* = 6
x = 18
There are 18 trucks in the parking lot.

4. Gail has 8 butterfly stickers. She has 4 more dinosaur stickers than butterfly stickers. How many stickers does she have in all?
Let *x* represent the number of stickers Gail has in all.

8 + 8 + 4 = *x*
x = 20
Gail has 20 stickers in all.

BUILD THE CONCEPT

Owen ran on Monday, Wednesday, and Friday. He ran 5 miles on Monday and 8 miles on Wednesday. He ran 19 miles in all. How many miles did he run on Friday?
Let *x* represent the number of miles Owen ran on Friday.

5 + 8 + *x* = 19
x = 6
Owen ran 6 miles on Friday.

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 29

GET STARTED

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

How is the subtraction problem read? (21 minus 6) **Use the counting back strategy to find the difference. Start with 21 and count back 6: *21 . . . , 20, 19, 18, 17, 16, 15*. What is 21 minus 6?** (15)

Problem 2

How many addends are in problem 2? (3) **To add more than two numbers, work from left to right. What is 12 plus 5?** (17) **What is 17 plus 6?** (23) **What is 12 plus 5 plus 6?** (23)

MODEL NEW SKILLS

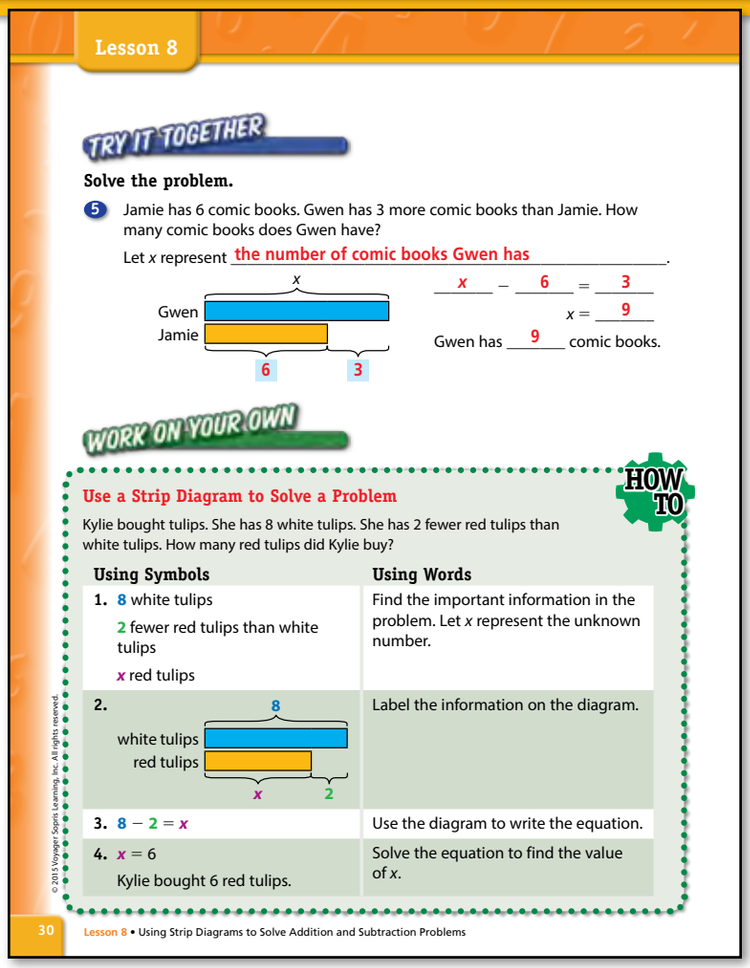
Problem 3

Read problem 3. What are you trying to find? (the number of trucks in the parking lot) **You can use a letter to represent this number. When a letter is used to represent a number, the letter is called a variable. The letter *x* is commonly used to represent the number you are trying to find. So in this problem, what does the variable *x* represent?** (the number of trucks in the parking lot)

Read the problem again. Are there more trucks or cars in the parking lot? (cars) **Now look at the diagram. What does 24 represent in the problem?** (the number of cars) **What does *x* represent in the problem?** (the number of trucks) **Which bar is longer?** (the bar for 24) **The 6 on the diagram represents the difference between the numbers of cars and trucks.**

From the diagram, you can write an equation that you can use to solve the problem. An equation is a mathematical sentence that uses an equal sign. For this problem, we will write a subtraction equation because the diagram compares the lengths of the two strips. What is the difference in the lengths of the strips? (6) **Write 6 to the right of the equal sign. Now write the subtraction problem to the left of the equal sign. Look at the strips. Which is longer?** (the blue strip) **What is the length of the blue strip?** (24) **Write 24 as the number before the minus sign. What is the equation?** (24 – *x* = 6)

Finally, solve the equation. What number subtracted from 24 equals 6? (18) **So *x* is equal to 18. What does *x* represent?** (the number of trucks in the parking lot) **How many trucks are in the parking lot?** (18)



Lesson 8

TRY IT TOGETHER

Solve the problem.

5 Jamie has 6 comic books. Gwen has 3 more comic books than Jamie. How many comic books does Gwen have?

Let x represent the number of comic books Gwen has.

$x - 6 = 3$

$x = 9$

Gwen has 9 comic books.

WORK ON YOUR OWN

HOW TO

Use a Strip Diagram to Solve a Problem

Kylie bought tulips. She has 8 white tulips. She has 2 fewer red tulips than white tulips. How many red tulips did Kylie buy?

Using Symbols	Using Words
1. 8 white tulips 2 fewer red tulips than white tulips x red tulips	Find the important information in the problem. Let x represent the unknown number.
2.	Label the information on the diagram.
3. $8 - 2 = x$	Use the diagram to write the equation.
4. $x = 6$ Kylie bought 6 red tulips.	Solve the equation to find the value of x.

Problem 4

Read problem 4. What are you trying to find? (the number of stickers Gail has in all) **So in this problem, what will the variable *x* represent?** (the number of stickers Gail has in all) **Notice that the brace under *x* includes all the strips below it.**

The strips represent the number of each kind of sticker Gail has. Read the problem again. What kinds of stickers does she have? (butterfly and dinosaur stickers) **The left-most green strip represents the number of butterfly stickers. How many butterfly stickers does she have?** (8) **Write 8 under this strip. The remaining two strips together represent the number of dinosaur stickers. Gail has 4 more dinosaur stickers than butterfly stickers. So, she has 8 plus 4 dinosaur stickers. Write 8 under the green strip and 4 under the yellow strip.**

From the diagram, you can write an equation. What does *x* represent in the diagram? (the total length of the strips) **Write *x* in the equation to the right of the equal sign. What is the length of each green strip?** (8) **What is the length of the yellow strip?** (4) **What operation do you use to find the total length of the strips?** (addition) **What numbers should you add to find the total length?** (8, 8, 4) **Now write the addition problem to the left of the equal sign. What is the equation?** ($8 + 8 + 4 = x$)

Finally, solve the equation to find the value of *x*. What is 8 plus 8? (16) **What is 16 plus 4?** (20) **What does *x* represent?** (the number of stickers Gail has in all) **How many stickers does Gail have in all?** (20)

BUILD THE CONCEPT

Model how to solve a problem using a variable and a strip diagram.

Read the problem. What are you trying to find? (the number of miles Owen ran on Friday) **So in this problem, what will the variable *x* represent?** (the number of miles Owen ran on Friday)

Read the problem again. How many days did Owen run? (three) **Look at the diagram. Each strip represents the number of miles Owen ran on a particular day. One of the strips is already labeled with a variable. What does this strip represent?** (the number of miles Owen ran on Friday) **How many miles did he run on the other two days?** (5 miles and 8 miles) **Write 5 and 8 under the other two strips. Under which strip did you write 5?** (the green strip) **Why?** (5 is less than 8 and it is the shorter strip.) **How many miles did Owen run in all?** (19) **Where should this number be written on the diagram?** (above the brace that includes all three strips)

From the diagram, write the equation. What does 19 represent in the diagram? (the total length of the strips) **Write 19 to the right of the equal sign in the equation. What is the length of the green strip?** (5) **What is the length of the blue strip?** (8) **What is the length of the yellow strip?** (*x*) **What operation do you use to find the total length of the strips?** (addition) **Now write the addition problem to the left of the equal sign. What is the equation?** ($5 + 8 + x = 19$)

Finally, solve the equation to find the value of *x*. What is 5 plus 8? (13) **Thirteen plus what number equals 19?** (6) **So, how many miles did Owen run on Friday?** (6 miles)

TRY IT TOGETHER

Work with students to complete this skill.

SCAFFOLD INSTRUCTION

Problem 5

Read problem 5. What are you trying to find? (the number of comic books Gwen has) **So in this problem, what does the variable *x* represent?** (the number of comic books Gwen has) **What does the top strip in the diagram represent?** (the number of comic books Gwen has)

What does the bottom strip in the diagram represent? (the number of comic books Jamie has) **How many comic books does Jamie have?** (6) **Write this number on the diagram. What is the difference in the numbers of comic books?** (3) **How do you know?** (Gwen has 3 more comic books than Jamie.) **Write 3 on the diagram under the rightmost brace, which indicates the difference.**

From the diagram, you can write an equation that you can use to solve the problem. What is the equation? ($x - 6 = 3$)

Finally, solve the equation to find the value of *x*. Six subtracted from what number equals 3? (9) **How many comic books does Gwen have?** (9)

WORK ON YOUR OWN

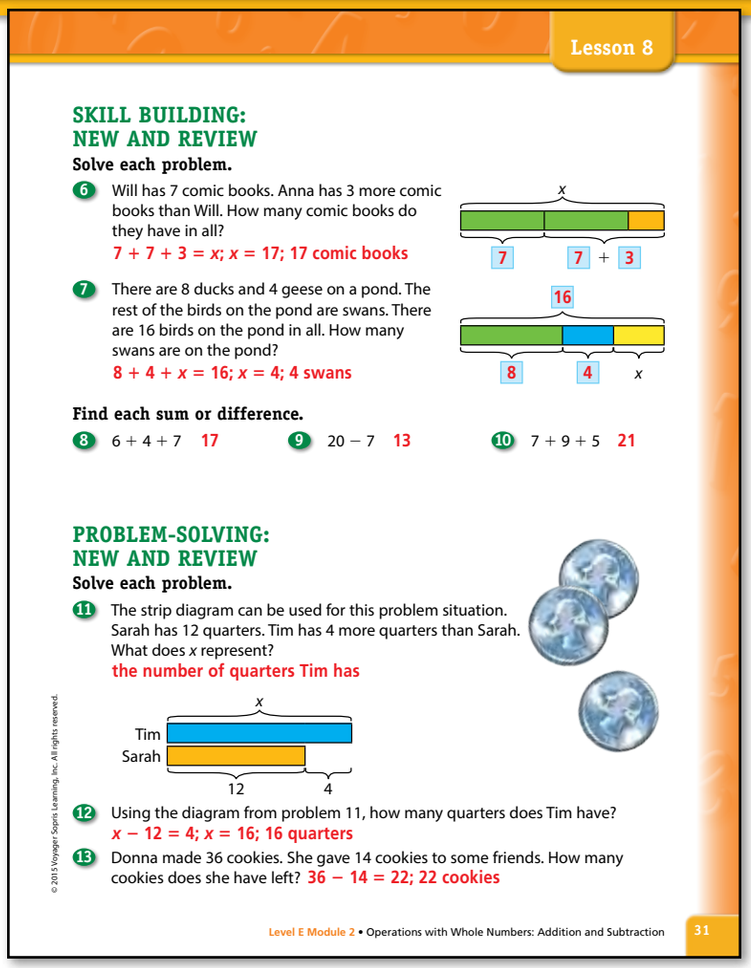
MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 6–13

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.



Lesson 8

SKILL BUILDING: NEW AND REVIEW

Solve each problem.

6. Will has 7 comic books. Anna has 3 more comic books than Will. How many comic books do they have in all?
   7 + 7 + 3 = *x*; *x* = 17; 17 comic books

7. There are 8 ducks and 4 geese on a pond. The rest of the birds on the pond are swans. There are 16 birds on the pond in all. How many swans are on the pond?
   8 + 4 + *x* = 16; *x* = 4; 4 swans

Find each sum or difference.

8. 6 + 4 + 7 17
9. 20 − 7 13
10. 7 + 9 + 5 21

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

11. The strip diagram can be used for this problem situation. Sarah has 12 quarters. Tim has 4 more quarters than Sarah. What does *x* represent?
    the number of quarters Tim has

12. Using the diagram from problem 11, how many quarters does Tim have?
    x − 12 = 4; *x* = 16; 16 quarters
13. Donna made 36 cookies. She gave 14 cookies to some friends. How many cookies does she have left? 36 − 14 = 22; 22 cookies

CHECK UP

ASSESS INFORMALLY

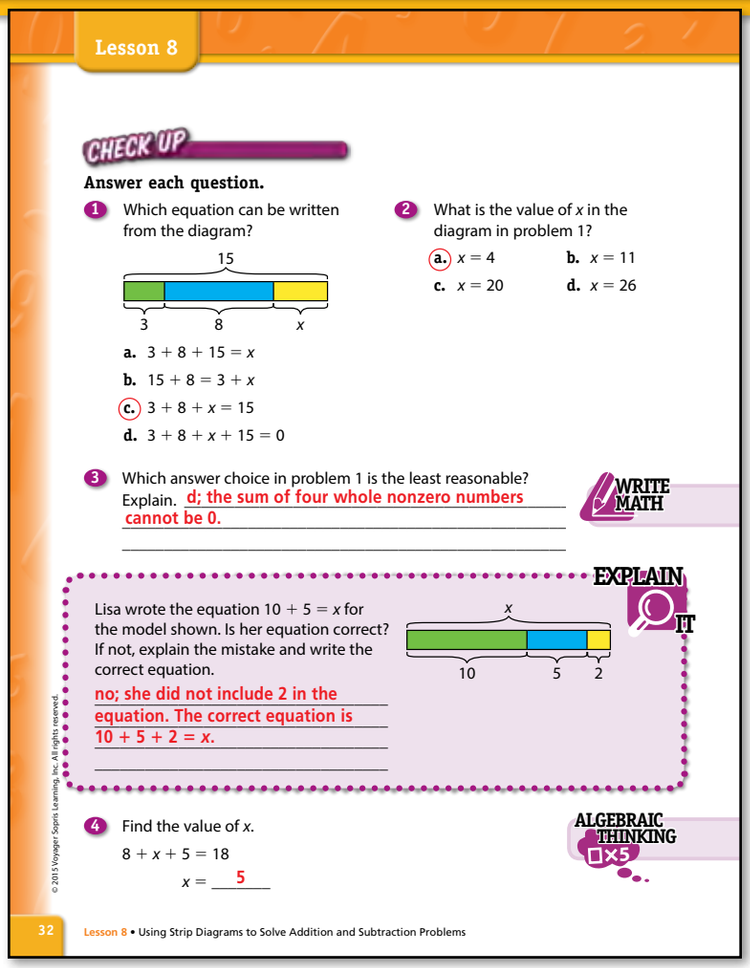
Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered problem 1 incorrectly: The student did not understand the relationship between the numbers above and below the strips. Use Additional Resources in E.2.8 to review how to write an equation from a strip diagram.

If student answered 2b: The student added 3 and 8 but did not find the number that when added to 11 results in 15. Use Additional Resources in E.2.8 to review how to find the missing number in an equation.

If student answered 2c or 2d: The student solved an incorrect equation. Use Additional Resources in E.2.8 to review how to write an equation from a strip diagram.



Lesson 8

CHECK UP

Answer each question.

1. Which equation can be written from the diagram?

a. $3 + 8 + 15 = x$
b. $15 + 8 = 3 + x$
c. $3 + 8 + x = 15$
d. $3 + 8 + x + 15 = 0$

2. What is the value of x in the diagram in problem 1?

a. $x = 4$ b. $x = 11$
c. $x = 20$ d. $x = 26$

3. Which answer choice in problem 1 is the least reasonable? Explain. d; the sum of four whole nonzero numbers cannot be 0.

WRITE MATH

EXPLAIN IT

Lisa wrote the equation $10 + 5 = x$ for the model shown. Is her equation correct? If not, explain the mistake and write the correct equation.

no; she did not include 2 in the equation. The correct equation is $10 + 5 + 2 = x$.

4. Find the value of x.

$8 + x + 5 = 18$

$x =$ 5

ALGEBRAIC THINKING

32 Lesson 8 • Using Strip Diagrams to Solve Addition and Subtraction Problems

WRITE MATH

If student answered problem 3 incorrectly: While students work together, remind the student that a sum of nonzero whole numbers must be greater than 0.

EXPLAIN IT

As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.

Technology

Have students use an online search engine to discover other ways to apply using a strip diagram to solve addition and subtraction problems in real-life situations. Additional digital content is available through this feature in the eBook.

DIFFERENTIATION

Additional Resources

Vmath Reteach
Reteach Student Module 2 Lesson 8
Reteach Teacher Module 2 Lesson 8

Extra Practice
Student Book page 43

English Language Learners

Review key words that indicate arithmetic operations or indicate relationships between quantities. Remind students that *fewer* can indicate subtraction and *more* can indicate addition. These words can also indicate a comparison of quantities, depending on a problem situation. The phrase *in all* typically indicates a sum or total of quantities.

Show students strip diagrams that represent addition problems and subtraction problems and use the key words to describe the relationship between the strips in the diagrams. Point out to students that addition problems are modeled by strips in a single row so that the total can be found. Point out that subtraction problems are modeled by strips one above another so that the difference in lengths can be seen.

Students with Special Needs

It may be helpful to have students use strips of paper to model the strip diagrams in this lesson. Be sure to use strips that are of uniform length so that students can easily make comparisons.

Lesson 9

Objective

To estimate differences

Preskills	Lesson
Rounding Whole Numbers	E.1.10
Subtracting 3-Digit Numbers with Regrouping	E.2.6 and E.2.7

Model the following skills for students.

REVIEW PRESKILLS

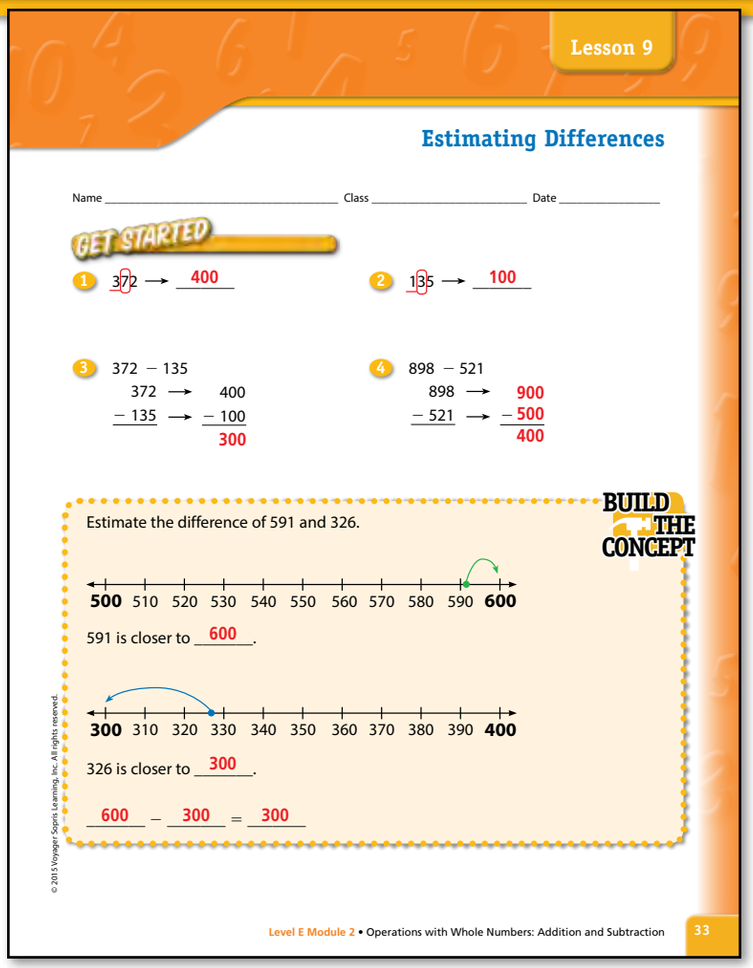
Problem 1

The rule for rounding is if the digit to the right of the place value being rounded is less than 5, keep the digit being rounded the same and write zeros for the digits after it. If the digit to the right of the place value being rounded is greater than 5 or equal to 5, round up to the next digit and write zeros for the digits after it.

What is the greatest place value in 372? (hundreds) **What digit is in the hundreds place?** (3) **Underline the 3. What digit is to the right?** (7) **Circle the 7. Will 3 round up or be kept the same?** (round up) **What is 372 rounded to its greatest place value?** (400)

Problem 2

Look at 135. What is its greatest place value? (hundreds place) **What digit is in the hundreds place?** (1) **Underline the 1. What digit is to the right of 1?** (3) **Circle the 3. Will 1 round up or be kept the same?** (kept the same) **Why?** (Three is less than 5.) **What is 135 rounded to the nearest hundred?** (100)



Lesson 9

Estimating Differences

Name _____ Class _____ Date _____

GET STARTED

1. 372 → 400

2. 135 → 100

3. 372 − 135
   372 → 400
   − 135 → − 100
   300

4. 898 − 521
   898 → 900
   − 521 → − 500
   400

BUILD THE CONCEPT

Estimate the difference of 591 and 326.

500 510 520 530 540 550 560 570 580 590 600

591 is closer to 600.

300 310 320 330 340 350 360 370 380 390 400

326 is closer to 300.

600 − 300 = 300

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 33

MODEL NEW SKILLS

Problem 3

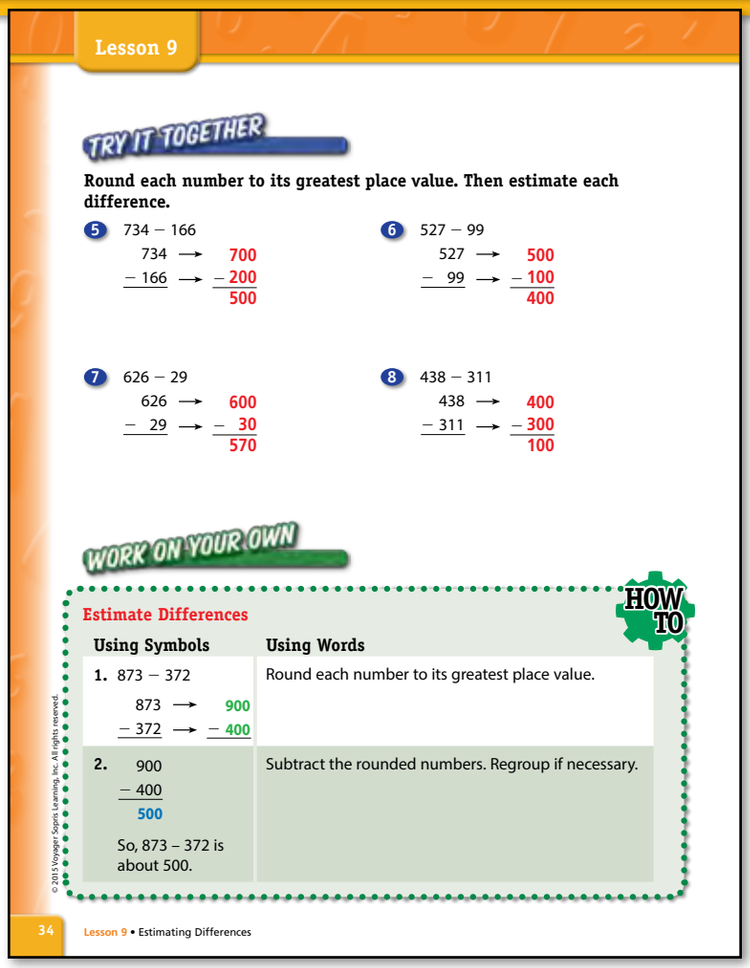
To find an estimated difference in a subtraction problem, first round each of the numbers to its greatest place value. Look at problem 3. What are the two numbers in the subtraction problem? (372 and 135) **These numbers have been rounded to their greatest place value in problems 1 and 2. What is 372 rounded to its greatest place value?** (400) **What is 135 rounded to its greatest place value?** (100)

Now find the difference of the rounded numbers. What is 400 minus 100? (300) **So, the difference of 372 and 135 is about 300.**

Problem 4

Look at the numbers in problem 4. To find the estimated difference of 898 and 521, first round each number to its greatest value. What is the greatest place value in both 898 and 521? (hundreds) **What is 898 rounded to the nearest hundred?** (900) **What is 521 rounded to the nearest hundred?** (500)

Next find the difference of the rounded numbers. What is 900 minus 500? (400) **The difference of 898 and 521 is about 400.**



Lesson 9

TRY IT TOGETHER

Round each number to its greatest place value. Then estimate each difference.

5. 734 − 166

734 → 700
− 166 → − 200
500

6. 527 − 99

527 → 500
− 99 → − 100
400

7. 626 − 29

626 → 600
− 29 → − 30
570

8. 438 − 311

438 → 400
− 311 → − 300
100

WORK ON YOUR OWN

HOW TO

Estimate Differences

Using Symbols	Using Words
1. 873 − 372 873 → 900 − 372 → − 400	Round each number to its greatest place value.
2. 900 − 400 500 So, 873 – 372 is about 500.	Subtract the rounded numbers. Regroup if necessary.

34 Lesson 9 • Estimating Differences

BUILD THE CONCEPT

Model how to find an estimated difference using a number line.

To find an estimated difference, a number line can be used. Look at the problem 591 minus 326. To find an estimated difference, each of the numbers in the problem needs to be rounded to its greatest place value. What is the greatest place value in each addend? (hundreds)

Now look at the number lines. On the top number line, 591 has been plotted. Is 591 closer to 500 or 600? (600) **Look at the bottom number line. Is 326 closer to 300 or 400?** (300)

Next, find the difference of the rounded numbers. What is 600 minus 300? (300) **So the estimated difference of 591 and 326 is 300.**

TRY IT TOGETHER

Work with students to complete these skills.

SCAFFOLD INSTRUCTION

Problem 5

Round each of these numbers to its greatest place value. What is the greatest place value of each number? (hundreds) **What is 734 rounded to the nearest hundred?** (700) **What is 166 rounded to the nearest hundred?** (200)

Subtract the rounded numbers. What is 700 minus 200? (500) **So the estimated difference of 734 and 166 is 500.**

Problem 6

Round each of these numbers to its greatest place value, and write the rounded numbers in a column. What is 527 rounded to the nearest hundred? (500) **What is 99 rounded to the nearest ten?** (100) **What is the estimated difference of 527 and 99?** (400)

Problem 7

What is 626 rounded to the nearest hundred? (600) **What is 29 rounded to the nearest ten?** (30) **What is the estimated difference of 626 and 29?** (570)

Problem 8

What is 438 rounded to the nearest hundred? (400) **What is 311 rounded to the nearest hundred?** (300) **What is the estimated difference of 438 and 311?** (100)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

PROBLEM-SOLVING

This problem illustrates the **Using Rounding and Estimation** strategy. Students are shown how the four-step problem-solving process is used to solve a word problem involving rounding. The instruction is immediately followed by application of the strategy in problems 18 and 19.

Have students read the problem.

Ask students whether an exact answer or an estimate is needed. Students should be made aware that the word *about* indicates that an estimation, not an exact answer, is needed.

Have students list the numbers in the problem:

347
94

Review the steps for rounding whole numbers and round each of the numbers to its greatest place value.

Then, have students subtract the rounded numbers: 300 – 90 = 210.

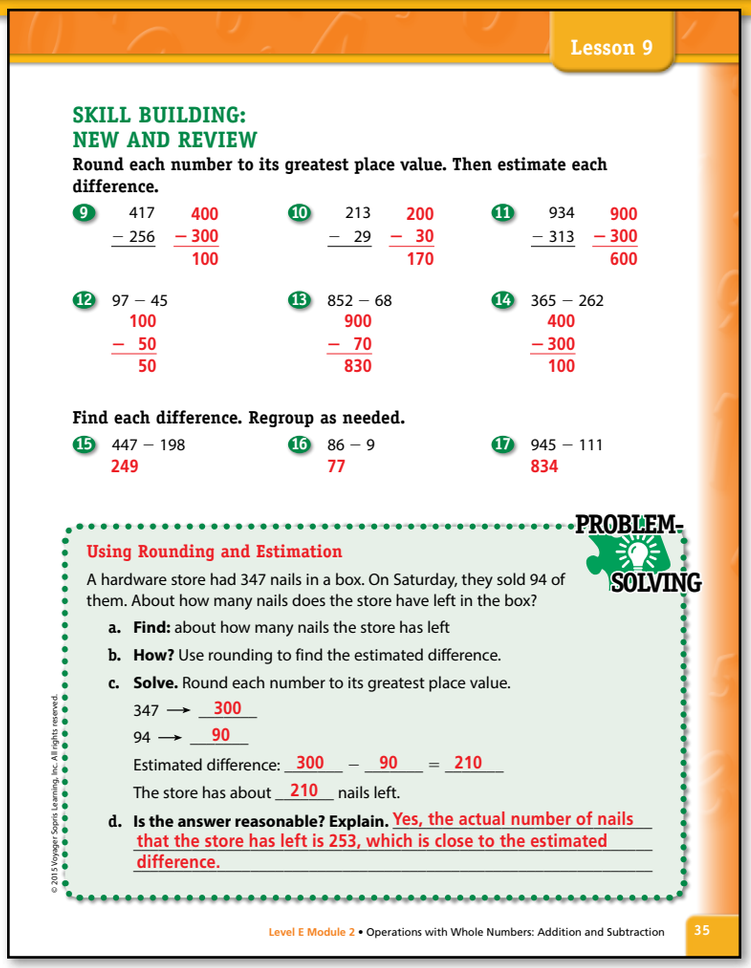
To check the answer, have students subtract the numbers in the problem to find the exact number of nails:

$$\begin{array}{r} 347 \\ -\ 94 \\ \hline 253 \end{array}$$

The estimation, 210, and the exact difference, 253, are close so the answer is reasonable.

Problems 9–21

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.



Lesson 9

SKILL BUILDING: NEW AND REVIEW

Round each number to its greatest place value. Then estimate each difference.

9. 417 − 256 → 400 − 300 = 100
10. 213 − 29 → 200 − 30 = 170
11. 934 − 313 → 900 − 300 = 600
12. 97 − 45 → 100 − 50 = 50
13. 852 − 68 → 900 − 70 = 830
14. 365 − 262 → 400 − 300 = 100

Find each difference. Regroup as needed.

15. 447 − 198 = 249
16. 86 − 9 = 77
17. 945 − 111 = 834

PROBLEM-SOLVING

Using Rounding and Estimation

A hardware store had 347 nails in a box. On Saturday, they sold 94 of them. About how many nails does the store have left in the box?

a. **Find:** about how many nails the store has left
b. **How?** Use rounding to find the estimated difference.
c. **Solve.** Round each number to its greatest place value.
347 → 300
94 → 90
Estimated difference: 300 − 90 = 210
The store has about 210 nails left.
d. **Is the answer reasonable? Explain.** Yes, the actual number of nails that the store has left is 253, which is close to the estimated difference.

Problem 20 Reminder

Students should give an exact answer unless the problem asks for an estimate.

Problem 21 Reminder

Make sure students read the information in the table correctly before rounding and finding the estimated difference.

CHECK UP

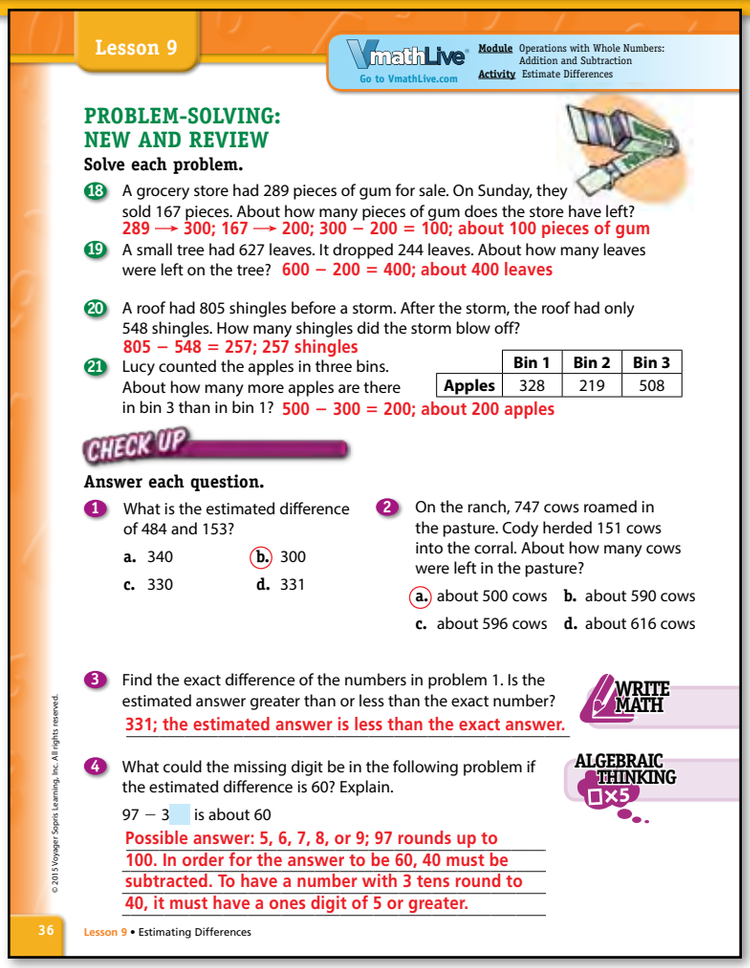
ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a or 2b: The student did not round correctly. Use Additional Resources in E.1.10 to reteach how to round whole numbers.

If student answered 1d or 2c: The student gave an exact answer. Point out the words *estimate* and *about*; these words indicate that an estimated answer is desired.



Lesson 9

VmathLive Go to VmathLive.com
Module Operations with Whole Numbers: Addition and Subtraction
Activity Estimate Differences

PROBLEM-SOLVING: NEW AND REVIEW

Solve each problem.

18 A grocery store had 289 pieces of gum for sale. On Sunday, they sold 167 pieces. About how many pieces of gum does the store have left?
289 ⟶ 300; 167 ⟶ 200; 300 − 200 = 100; about 100 pieces of gum

19 A small tree had 627 leaves. It dropped 244 leaves. About how many leaves were left on the tree? 600 − 200 = 400; about 400 leaves

20 A roof had 805 shingles before a storm. After the storm, the roof had only 548 shingles. How many shingles did the storm blow off?
805 − 548 = 257; 257 shingles

21 Lucy counted the apples in three bins. About how many more apples are there in bin 3 than in bin 1? 500 − 300 = 200; about 200 apples

	Bin 1	Bin 2	Bin 3
Apples	328	219	508

CHECK UP

Answer each question.

1 What is the estimated difference of 484 and 153?
a. 340 (b.) 300
c. 330 d. 331

2 On the ranch, 747 cows roamed in the pasture. Cody herded 151 cows into the corral. About how many cows were left in the pasture?
(a.) about 500 cows b. about 590 cows
c. about 596 cows d. about 616 cows

3 Find the exact difference of the numbers in problem 1. Is the estimated answer greater than or less than the exact number?
331; the estimated answer is less than the exact answer.

WRITE MATH

4 What could the missing digit be in the following problem if the estimated difference is 60? Explain.
97 − 3 ☐ is about 60
Possible answer: 5, 6, 7, 8, or 9; 97 rounds up to 100. In order for the answer to be 60, 40 must be subtracted. To have a number with 3 tens round to 40, it must have a ones digit of 5 or greater.

ALGEBRAIC THINKING ☐×5

36 Lesson 9 • Estimating Differences

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student how to subtract to find the actual difference in problem 1. Then review with the student how to compare numbers.

Technology

Have students use an online search engine to discover other ways to apply estimating differences in real-life situations. Additional digital content is available through this feature in the eBook.

DIFFERENTIATION

Additional Resources

VmathLive

VmathLive

Module: Operations with Whole Numbers: Addition and Subtraction

Activity: Estimate Differences

Vmath Reteach

Reteach Student Module 2 Lesson 9

Reteach Teacher Module 2 Lesson 9

Extra Practice

Student Book page 44

English Language Learners

Remind students that an estimation is a guess that is based on information. Explain that in math problems, the word *about* is used to show that an exact answer is not needed. When an exact answer is not needed, the problem can be solved using estimation.

Students with Special Needs

Have students make a number line from 0 to 1,000, with tick marks at each interval of 100. Students will use this number line to help them round. Write *857 − 381* on the board. Tell students to look at the number line and draw a star where 857 should be. Ask students which two hundreds it is between. Then ask students whether it is closer to 800 or 900. Record 900 on the board. Have a student draw a star on the number line near where 381 should be. Have students identify whether 381 is closer to 300 or 400. Record 400 on the board. Have a student come to the board and subtract 400 from 900. Show that 857 − 381 is about 500.

Lesson 10

Objective

To solve an application problem by choosing an operation

Preskills	Lesson
Adding Multi-Digit Numbers with Regrouping	E.2.3
Subtracting 3-Digit Numbers with Regrouping	E.2.6 and E.2.7

Model the following skills for students.

REVIEW PRESKILLS

Problem 1

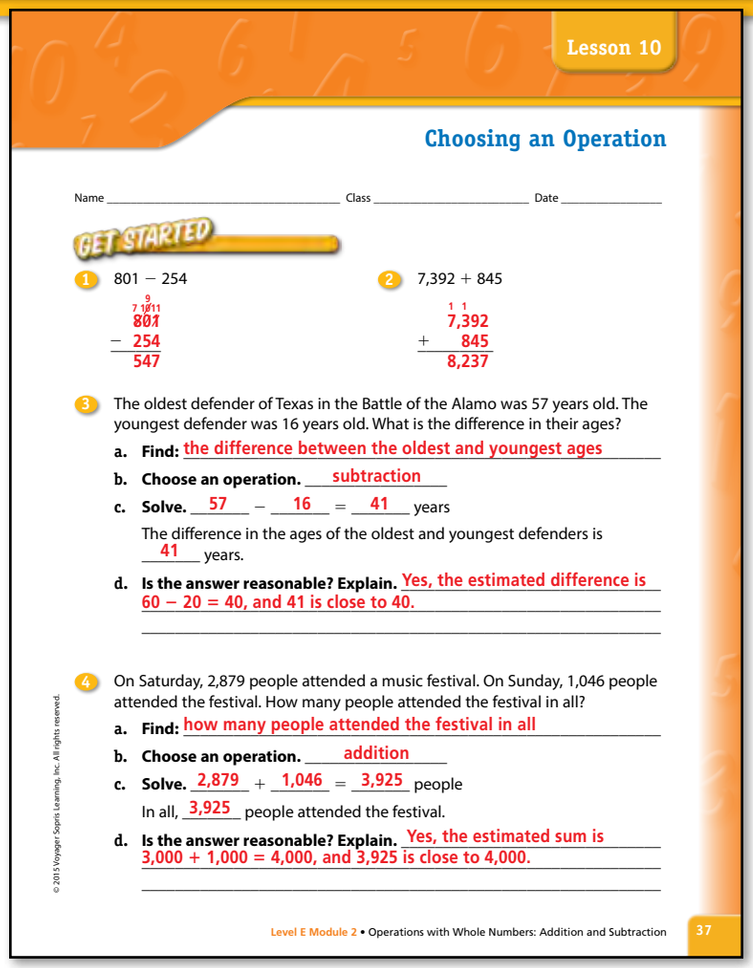
First, write the problem vertically. Can the digits in the ones column be subtracted? (no) **Can 1 ten be regrouped from the tens digit?** (no) **One ten cannot be regrouped because there are 0 tens in the top number.**

What should be done next? (Move to the hundreds column and regroup.) **How can 8 hundreds be regrouped?** (7 hundreds and 10 tens) **How can 10 tens be regrouped?** (9 tens and 10 ones) **Subtract. What is the difference of 801 and 254?** (547)

Problem 2

Write the problem vertically. What is the sum of the digits in the ones column? (7) **No regrouping is needed for the ones column. What is the sum of the digits in the tens column?** (13) **Regrouping is needed because 13 will not fit in the tens column. How can 13 tens be regrouped?** (1 hundred and 3 tens)

What is the sum of the digits in the hundreds column? (12) **How can 12 hundreds be regrouped?** (1 thousand and 2 hundreds) **What is the sum of the digits in the thousands column?** (8) **What is the sum of 7,392 and 845?** (8,237)



Lesson 10

Choosing an Operation

Name _____ Class _____ Date _____

GET STARTED

1. 801 − 254

   7 10 11
   ~~8~~ ~~0~~ ~~1~~
   − 2 5 4
   5 4 7

2. 7,392 + 845

   1 1
   7,392
   + 845
   8,237

3. The oldest defender of Texas in the Battle of the Alamo was 57 years old. The youngest defender was 16 years old. What is the difference in their ages?
   a. **Find:** the difference between the oldest and youngest ages
   b. **Choose an operation.** subtraction
   c. **Solve.** 57 − 16 = 41 years
      The difference in the ages of the oldest and youngest defenders is 41 years.
   d. **Is the answer reasonable? Explain.** Yes, the estimated difference is 60 − 20 = 40, and 41 is close to 40.

4. On Saturday, 2,879 people attended a music festival. On Sunday, 1,046 people attended the festival. How many people attended the festival in all?
   a. **Find:** how many people attended the festival in all
   b. **Choose an operation.** addition
   c. **Solve.** 2,879 + 1,046 = 3,925 people
      In all, 3,925 people attended the festival.
   d. **Is the answer reasonable? Explain.** Yes, the estimated sum is 3,000 + 1,000 = 4,000, and 3,925 is close to 4,000.

Level E Module 2 • Operations with Whole Numbers: Addition and Subtraction 37

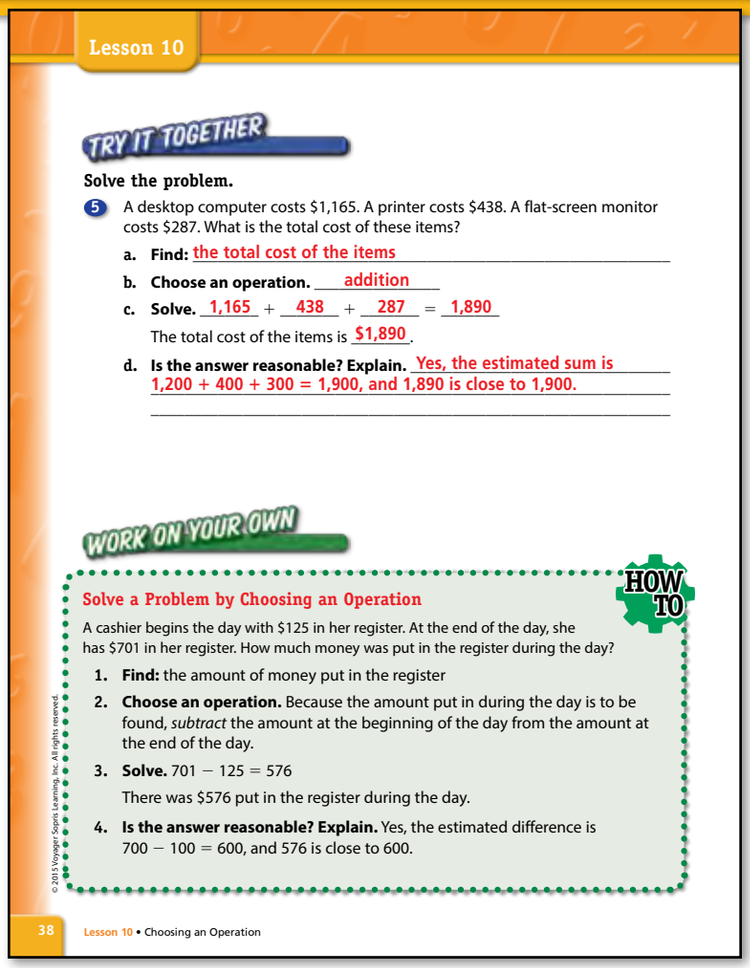
MODEL NEW SKILLS

Problem 3

Use the problem-solving plan to complete problem 3. First ask, "What am I trying to find?" What is the question asking for in the problem? (the difference between the oldest and the youngest ages) **Next ask, "What operation should I use?" What operation should be used?** (subtraction) **Why?** (The word *difference* means to subtract.)

What was the age of the oldest defender? (57) **What was the age of the youngest defender?** (16) **What subtraction expression should be used to solve the problem?** (57 − 16) **What is the difference?** (41) **What is the answer to the question?** (41 years)

Estimation can be used to determine whether the answer is reasonable. Rounded to the greatest place value, about how old was the oldest defender? (about 60 years old) **Rounded to the greatest place value, about how old was the youngest defender?** (about 20 years old) **What is 60 minus 20?** (40) **Last ask, "Is the answer reasonable?" Is the answer reasonable?** (yes) **Why?** (The estimated difference is 60 − 20 = 40, and 41 is close to 40.)



Lesson 10

TRY IT TOGETHER

Solve the problem.

5 A desktop computer costs $1,165. A printer costs $438. A flat-screen monitor costs $287. What is the total cost of these items?

a. **Find:** the total cost of the items

b. **Choose an operation.** addition

c. **Solve.** 1,165 + 438 + 287 = 1,890

The total cost of the items is $1,890.

d. **Is the answer reasonable? Explain.** Yes, the estimated sum is 1,200 + 400 + 300 = 1,900, and 1,890 is close to 1,900.

WORK ON YOUR OWN

HOW TO

Solve a Problem by Choosing an Operation

A cashier begins the day with $125 in her register. At the end of the day, she has $701 in her register. How much money was put in the register during the day?

1. **Find:** the amount of money put in the register
2. **Choose an operation.** Because the amount put in during the day is to be found, *subtract* the amount at the beginning of the day from the amount at the end of the day.
3. **Solve.** 701 − 125 = 576

   There was $576 put in the register during the day.
4. **Is the answer reasonable? Explain.** Yes, the estimated difference is 700 − 100 = 600, and 576 is close to 600.

38 Lesson 10 • Choosing an Operation

Problem 4

Use the problem-solving plan to complete problem 4. First ask, "What am I trying to find?" What is the question asking for in the problem? (how many people attended the festival in all) **Next ask, "What operation should I use?" What operation should be used to find the answer?** (addition) **Why?** (The words *in all* mean to add.)

How many people attended on Saturday? (2,879) **How many people attended on Sunday?** (1,046) **What addition expression should be used to solve the problem?** (2,879 + 1,046) **What is the sum?** (3,925) **What is the answer to the question?** (3,925 people)

Use estimation to determine whether the answer is reasonable. About how many people attended on Saturday? (3,000) **About how many people attended on Sunday?** (1,000) **What is 3,000 plus 1,000?** (4,000) **Next ask, "Is the answer reasonable?" Is the answer reasonable?** (yes) **Why?** (because the estimated sum is 3,000 + 1,000 = 4,000, and 3,925 is close to 4,000)

TRY IT TOGETHER

Work with students to complete this skill.

SCAFFOLD INSTRUCTION

Problem 5

First ask, "What am I trying to find?" What is the question asking for in this problem? (the total cost of the items) **Next ask, "What operation should I use?" What operation should be used?** (addition) **Why?** (The word *total* means to add.)

What amounts should be added? (1,165 + 438 + 287) **What is the total cost of all three items?** ($1,890) **Use estimation to determine whether the answer is reasonable. Round each dollar amount to the nearest hundred dollars. What is 1,165 rounded to the nearest hundred?** (1,200) **What is 438 rounded to the nearest hundred?** (400) **What is 287 rounded to the nearest hundred?** (300) **Now, add the rounded numbers. What is 1,200 plus 400 plus 300?** (1,900) **Is the answer reasonable?** (yes) **Why?** (The estimated sum, 1,900, is close to 1,890.)

WORK ON YOUR OWN

MONITOR INDEPENDENT WORK

HOW TO

Before students begin independent work, review the **HOW TO** process example. As you review, emphasize the words of mathematics by having students read aloud the words shown for each process step.

Problems 6–15

Have students work independently. Check work and have students total the number correct. Use Additional Resources as needed.

Problems 12–15 **Reminder**

Students must identify the correct information in the table and also choose the correct operation to solve the problems.

CHECK UP

ASSESS INFORMALLY

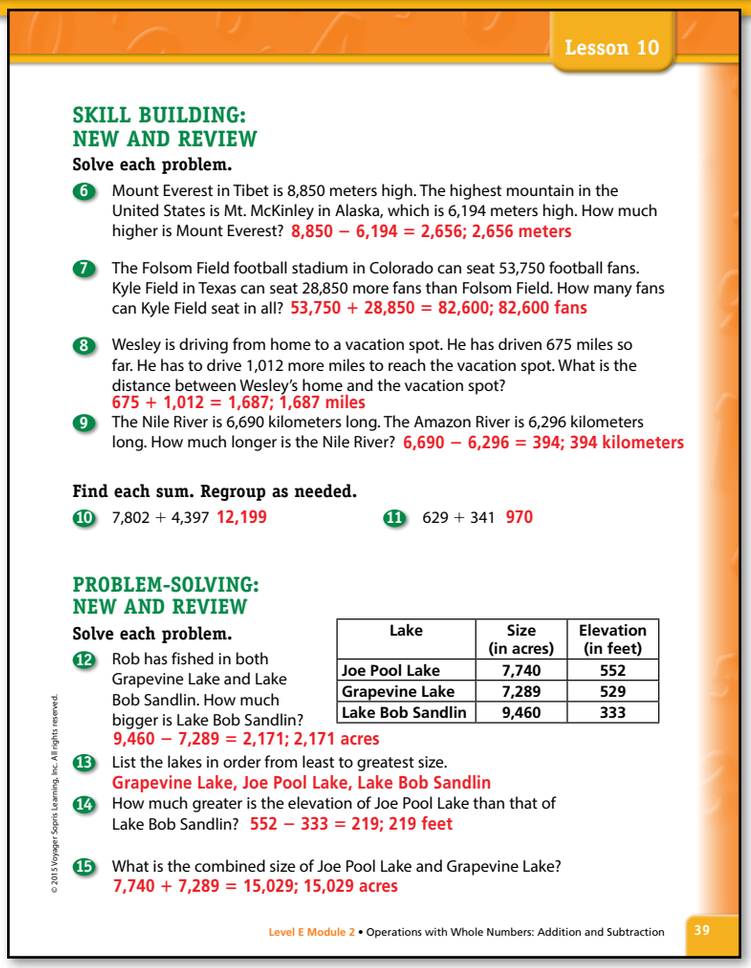
Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a or 2a: The student performed an incorrect operation. Use Additional Resources in E.2.10 to reteach how to choose the correct operation.

If student answered 1c: The student made an error regrouping in subtraction. Use Additional Resources in E.2.6 or E.2.7 to reteach how to subtract multi-digit numbers.

If student answered 2d: The student made an error regrouping in addition. Use Additional Resources in E.2.3 to reteach how to add multi-digit numbers.



Lesson 10

SKILL BUILDING: NEW AND REVIEW

Solve each problem.

6. Mount Everest in Tibet is 8,850 meters high. The highest mountain in the United States is Mt. McKinley in Alaska, which is 6,194 meters high. How much higher is Mount Everest? 8,850 − 6,194 = 2,656; 2,656 meters
7. The Folsom Field football stadium in Colorado can seat 53,750 football fans. Kyle Field in Texas can seat 28,850 more fans than Folsom Field. How many fans can Kyle Field seat in all? 53,750 + 28,850 = 82,600; 82,600 fans
8. Wesley is driving from home to a vacation spot. He has driven 675 miles so far. He has to drive 1,012 more miles to reach the vacation spot. What is the distance between Wesley's home and the vacation spot? 675 + 1,012 = 1,687; 1,687 miles
9. The Nile River is 6,690 kilometers long. The Amazon River is 6,296 kilometers long. How much longer is the Nile River? 6,690 − 6,296 = 394; 394 kilometers

Find each sum. Regroup as needed.

10. 7,802 + 4,397 12,199
11. 629 + 341 970

PROBLEM-SOLVING: NEW AND REVIEW

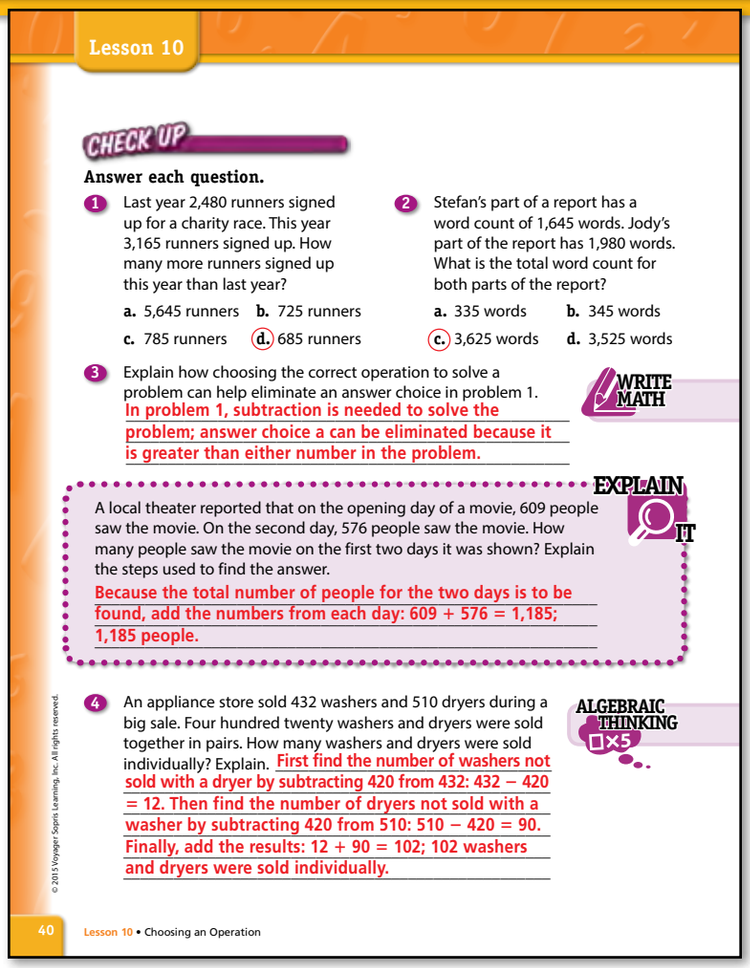
Solve each problem.

Lake	Size (in acres)	Elevation (in feet)
Joe Pool Lake	7,740	552
Grapevine Lake	7,289	529
Lake Bob Sandlin	9,460	333

12. Rob has fished in both Grapevine Lake and Lake Bob Sandlin. How much bigger is Lake Bob Sandlin? 9,460 − 7,289 = 2,171; 2,171 acres
13. List the lakes in order from least to greatest size. Grapevine Lake, Joe Pool Lake, Lake Bob Sandlin
14. How much greater is the elevation of Joe Pool Lake than that of Lake Bob Sandlin? 552 − 333 = 219; 219 feet
15. What is the combined size of Joe Pool Lake and Grapevine Lake? 7,740 + 7,289 = 15,029; 15,029 acres

WRITE MATH

If student answered problem 3 incorrectly: While students work together, review with the student that addition usually yields an answer that is greater than either addend and that subtraction usually yields an answer that is less than the greater number in the subtraction expression.



Lesson 10

CHECK UP

Answer each question.

1. Last year 2,480 runners signed up for a charity race. This year 3,165 runners signed up. How many more runners signed up this year than last year?

   a. 5,645 runners **b.** 725 runners
   c. 785 runners **d.** 685 runners

2. Stefan's part of a report has a word count of 1,645 words. Jody's part of the report has 1,980 words. What is the total word count for both parts of the report?

   a. 335 words **b.** 345 words
   c. 3,625 words **d.** 3,525 words

3. Explain how choosing the correct operation to solve a problem can help eliminate an answer choice in problem 1. WRITE MATH
   In problem 1, subtraction is needed to solve the problem; answer choice a can be eliminated because it is greater than either number in the problem.

EXPLAIN IT

A local theater reported that on the opening day of a movie, 609 people saw the movie. On the second day, 576 people saw the movie. How many people saw the movie on the first two days it was shown? Explain the steps used to find the answer.

Because the total number of people for the two days is to be found, add the numbers from each day: 609 + 576 = 1,185; 1,185 people.

4. An appliance store sold 432 washers and 510 dryers during a big sale. Four hundred twenty washers and dryers were sold together in pairs. How many washers and dryers were sold individually? Explain. ALGEBRAIC THINKING □×5
   First find the number of washers not sold with a dryer by subtracting 420 from 432: 432 − 420 = 12. Then find the number of dryers not sold with a washer by subtracting 420 from 510: 510 − 420 = 90. Finally, add the results: 12 + 90 = 102; 102 washers and dryers were sold individually.

EXPLAIN IT

As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.

DIFFERENTIATION

Additional Resources

Vmath Reteach

Reteach Student Module 2 Lesson 10

Reteach Teacher Module 2 Lesson 10

Extra Practice

Student Book page 44

English Language Learners

Review with students different types of language to look for when choosing an operation to solve a problem. On the board, write two columns labeled *Addition* and *Subtraction*. Match students with partners and have each pair of students look at the lesson and identify key words or phrases in each problem that indicate which operation to choose. Fill in the columns on the board. Possible answers for addition: *total, both, together, in all*. Possible answers for subtraction: *difference, how much higher than, how many more than*.

Students with Special Needs

To help students choose the correct operation to solve a problem, create a checklist using the steps in the **HOW TO** section. Write a set of word problems on index cards. Match students with partners and distribute one word problem card to each pair of students. Have one partner read each step and identify the key words or phrases for addition or subtraction. The second partner will then solve the problem and explain whether the answer is reasonable. Once the word problem is solved, have pairs of students switch word problems and roles.

Extra Practice Answer Key

Extra Practice

Name _____ Class _____ Date _____

Lesson PL2 Commutative and Associative Properties of Addition

Rewrite each addition problem using the Commutative or Associative Property of Addition. Then solve.

1. 6 + (3 + 8) (6 + 3) + 8 = 17
2. 4 + 3 3 + 4 = 7
3. 8 + 5 5 + 8 = 13
4. (6 + 5) + 5 6 + (5 + 5) = 16
5. 1 + (9 + 3) (1 + 9) + 3 = 13
6. 3 + 7 7 + 3 = 10
7. 7 + (3 + 5) (7 + 3) + 5 = 15
8. 9 + 6 6 + 9 = 15
9. 5 + 6 6 + 5 = 11
10. (8 + 1) + 9 8 + (1 + 9) = 18

Lesson 2 Adding 3-Digit Numbers with Regrouping

Find each sum. Regroup as needed.

1. 435 + 186 = 621
2. 468 + 472 + 261 = 1,201
3. 753 + 160 + 356 = 1,269
4. 602 + 178 + 120 = 900
5. 631 + 729 + 364 = 1,724
6. 155 + 355 = 510
7. 461 + 943 = 1,404
8. 167 + 356 + 905 = 1,428
9. 569 + 983 + 744 = 2,296

Extra Practice

Name _____ Class _____ Date _____

Lesson 3 Adding Multi-Digit Numbers with Regrouping

Find each sum. Regroup as needed.

1. 863 + 58 = 921
2. 2,415 + 547 = 2,962
3. 128,428 + 74,642 = 203,070
4. 1,019 + 625 + 42 = 1,686
5. 1,578 + 18 + 426 = 2,022
6. 46,215 + 45 + 1,697 = 47,957
7. 86,626 + 757 + 9,417 = 96,800
8. 25,822 + 848 = 26,670
9. 3,563 + 5,642 = 9,205
10. 2,483,144 + 1,621,101 = 4,104,245
11. 776,653 + 8,818 = 785,471
12. 243 + 5,728 = 5,971

Lesson 6 Subtracting 3-Digit Numbers with 2 Regroupings

Find each difference. Regroup as needed.

1. 416 − 127 = 289
2. 282 − 196 = 86
3. 516 − 348 = 168
4. 772 − 294 = 478
5. 952 − 669 = 283
6. 876 − 98 = 778
7. 414 − 26 388
8. 833 − 457 376
9. 411 − 166 245

Extra Practice

Name _____ Class _____ Date _____

Lesson 7 Subtracting 3-Digit Numbers with Zeros

Find each difference. Regroup as needed.

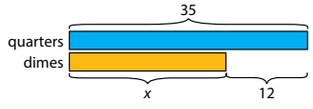
1. 70 − 17 = 53
2. 602 − 428 = 174
3. 610 − 26 = 584
4. 603 − 294 = 309
5. 506 − 169 = 337
6. 208 − 99 = 109
7. 307 − 58 249
8. 804 − 329 475
9. 407 − 368 39

Lesson 8 Using Strip Diagrams to Solve Addition and Subtraction Problems

Answer each question.

1. Jemma has 35 quarters. She has 12 fewer dimes than quarters. How many dimes does Jemma have?

   Let *x* represent the number of dimes

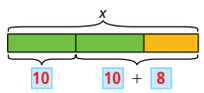
   35 − 12 = *x*

   x = 23

   Jemma has 23 dimes.

2. Warren has 10 toy trucks. He has 8 more toy cars than toy trucks. How many toys vehicles does he have in all?

   Let *x* represent the number of toy vehicles Warren has in all.

   10 + 10 + 8 = *x*

   x = 28

   Warren has 28 toy vehicles in all.

Extra Practice

Name _____ Class _____ Date _____

Lesson 9 Estimating Differences

Round each number to its greatest place value. Then estimate each difference.

1. 84 − 37 = 80 − 40 = 40
2. 323 − 153 = 300 − 200 = 100
3. 355 − 252 = 400 − 300 = 100
4. 772 − 33 = 800 − 30 = 770
5. 859 − 125 = 900 − 100 = 800
6. 609 − 149 = 600 − 100 = 500
7. 909 − 550 = 900 − 600 = 300
8. 426 − 235 = 400 − 200 = 200
9. 775 − 86 = 800 − 90 = 710

Lesson 10 Choosing an Operation

Solve each problem.

1. The lowest land elevation in the world is found at the Dead Sea between Israel and Jordan. The Dead Sea is 411 meters below sea level. The lowest elevation in the United States is at Death Valley, which is 86 meters below sea level. How much lower is the Dead Sea?
   411 − 86 = 325; 325 meters
2. A cashier begins the day with $175 in his register. At the end of the day, he has $903 in his register. How much money did he receive that day?
   903 − 175 = 728; $728
3. In 2004, $794 million in private support was given to the American Cancer Society. In that same year, $384 million was given to the American Heart Association. What is the total amount of private support money received by these two charities in 2004?
   794 + 384 = 1,178; $1,178 million
4. A clothing store sold 13,185 shirts the first year. The same store sold 26,321 shirts the second year. How many shirts did the store sell in both years?
   13,185 + 26,321 = 39,506; 39,506 shirts

Glossary

Associative Property of Addition
states that the grouping of the addends can be changed without affecting the sum

Commutative Property of Addition
states that the order of the addends can be changed without affecting the sum

equation
a mathematical sentence that uses an equal sign

variable
a letter or symbol that represents a number