2
LEVEL

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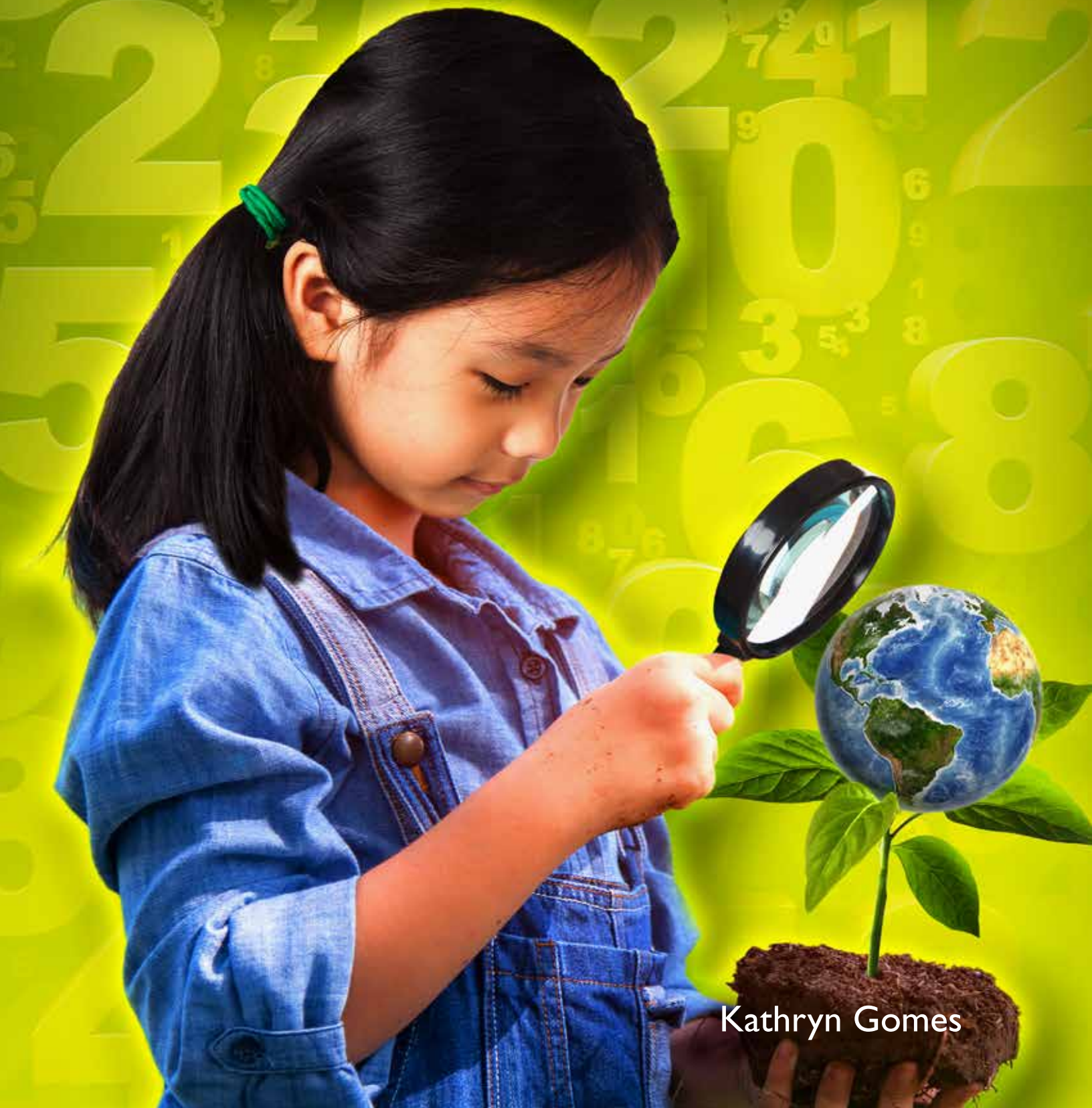
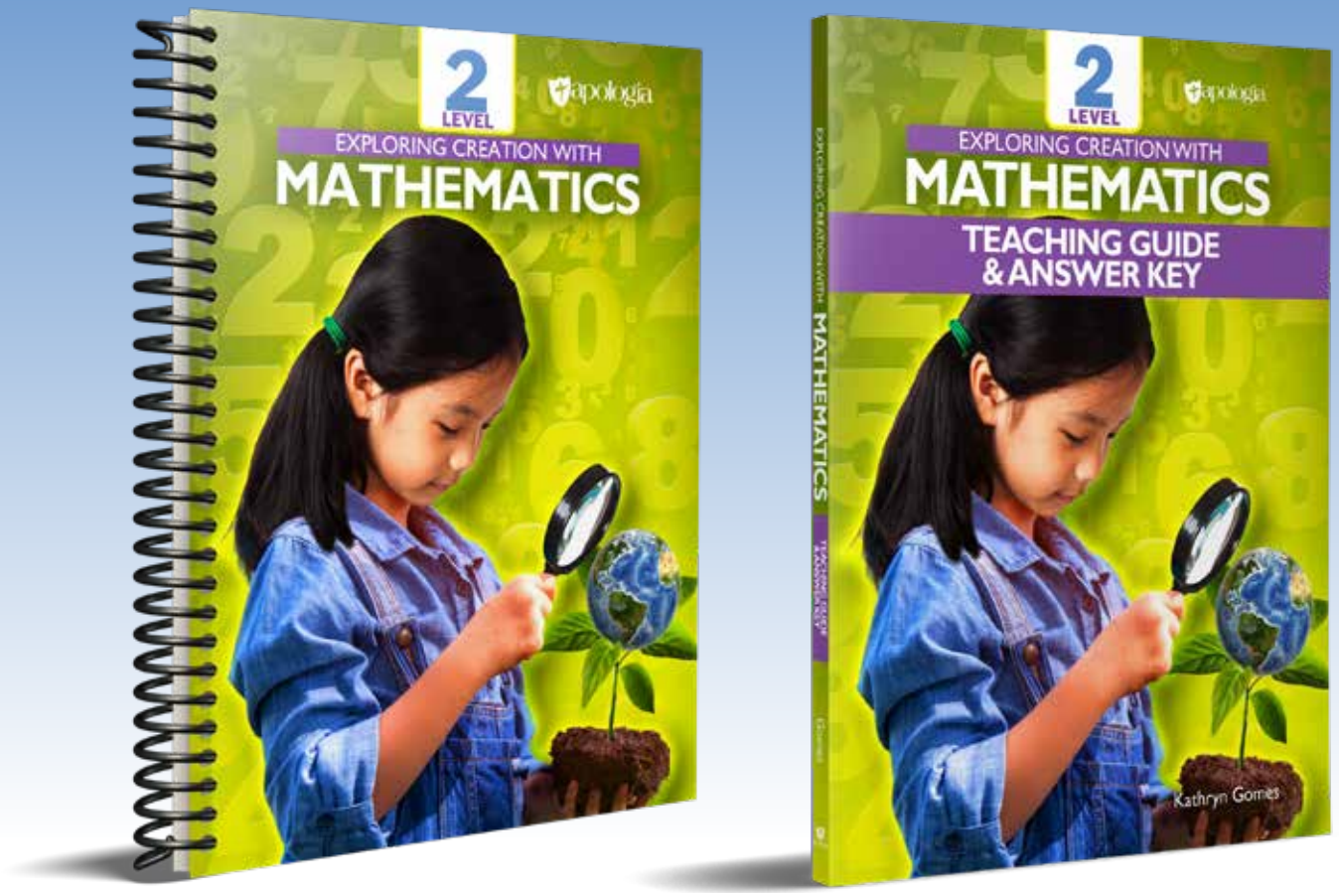
EXPLORING CREATION WITH

MATHEMATICS



Kathryn Gomes



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UNIT 1

NUMBER SENSE AND PLACE VALUE

Throughout history people used numbers to measure and record amounts. Different civilizations created their own written numbering systems. In Ancient Egypt they used symbols that look like pictures of animals or plants to represent numbers.

Egyptian Numeral Hieroglyphs						
1	10	100	1,000	10,000	100,000	1,000,000

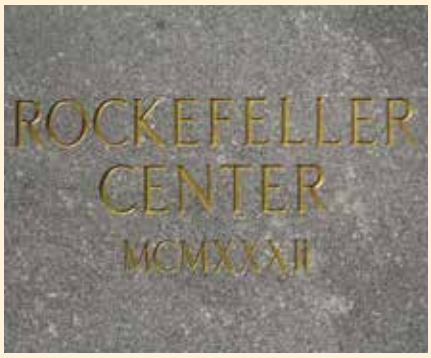
Skills Practice for Unit One:

Facts from First Grade (see answer key page 14 for more details)

The Romans created a different system using letters to represent some numbers. You may have seen their numerals inscribed on older buildings or on clocks.

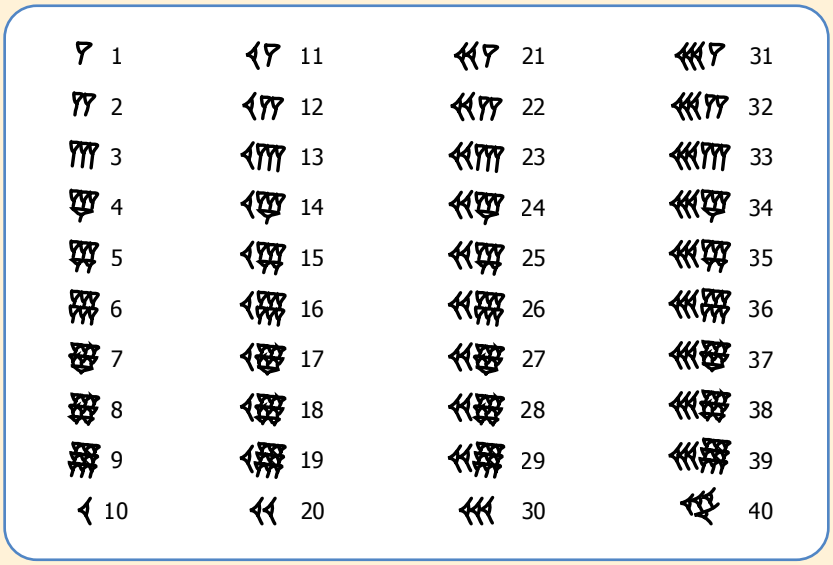
Roman Numerals											
1	2	3	4	5	6	7	8	9	10	50	100
I	II	III	IV	V	VI	VII	VIII	IX	X	L	C

This clock uses Roman numerals to show the numbers 1 to 12.

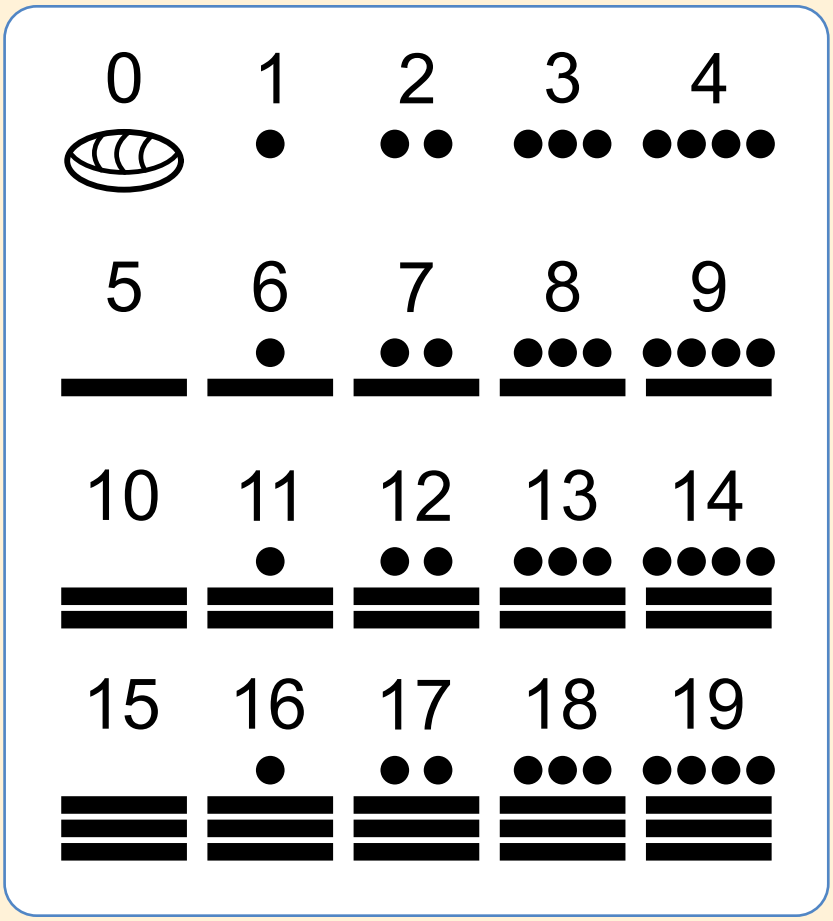


The date on the Rockefeller Center says 1932 in Roman numerals.

Other civilizations, such as the Babylonians and Mayans, invented numbering systems that are a little closer to what we use today.



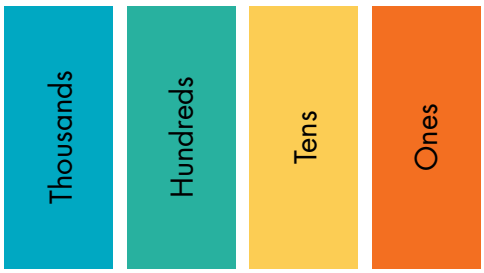
Can you see a repeating pattern in the Ancient Babylonian method?



Do you see a pattern in this Mayan numeral system? Do you also see that there is a symbol for zero?

The numbers we use today are represented by digits and the placement of the digits affects their value. This is called place value and we'll learn all about it this year. The positions in our current place value system look like this:

Place Value Chart



This system allows us to write numbers and perform operations much more easily. Which system do you think looks the easiest to learn?

Numeral Systems			
Hieroglyphs	Roman Numerals	Ancient Babylonian	Place Value
	CCXLIV		244

Humans have continued to develop different systems for writing numbers. We've even developed a system of numbers using only zeros and ones for use with computers.

Binary code is a numbering system that is used by computers. It only uses two digits, 1 and 0.

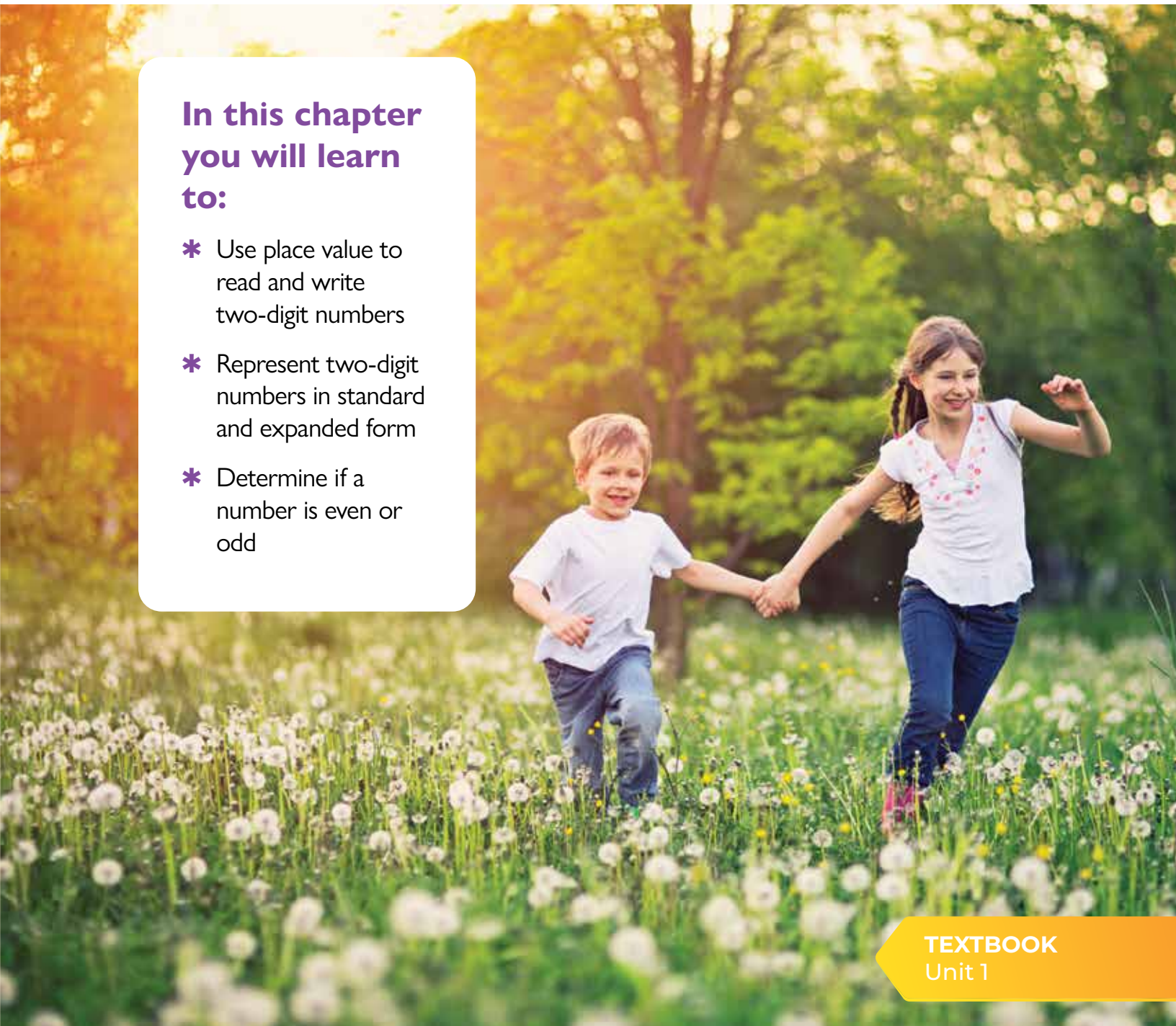
Of course, you already know that we still use some symbols in math. You've learned the following math symbols for plus (+), minus (-), equals (=), as well as others such as greater than (>) and less than (<). And you will continue to learn more math symbols in your math journey.

It's important to realize, however, that in all these examples humans just found different ways to record the amounts that God already put in His creation. We can create new systems for recording and manipulating numbers, but only God can create the numbers themselves.

CHAPTER

1

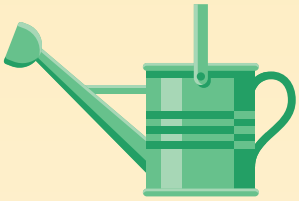
NUMBERS AND PATTERNS



In this chapter you will learn to:

- Use place value to read and write two-digit numbers
- Represent two-digit numbers in standard and expanded form
- Determine if a number is even or odd

TEXTBOOK
Unit 1



PLACE VALUE EXPLORATION

You Will Need:

- [ ] Paper
- [ ] Pencil
- [ ] Timer
- [ ] Colored pencils (to be used later)
- [ ] Lesson 1 Activity Sheet (to be used later)

You Will Do:

1. Have your parent or a friend set the timer for one minute. Draw as many stars as you can on the piece of paper.
2. When the minute is up count up your stars.
3. Switch and have your parent or friend try while you time them. Who can draw the most? Record the winner in the space below.
4. Reflect. How did you count up the stars? Did you group them to help you keep track? Talk with your parent about what you did.

Minute to Win It Stars Champion:

_____

drew _____ stars in one minute.

Practice

Carefully tear out the Lesson 1 Activity Sheet from the back of the answer key.

1. Look at the grid. How many total squares do you think there are?

   I guess there are _____ squares.

2. Start numbering the squares in order from left to right starting in the top row. Fill in the numbers 1 to 23.

3. Take another guess about how many squares are on the grid.

   I guess there are _____ squares.

4. Fill in the rest of the squares to check your answer. Have your parent look over your chart to make sure you numbered it correctly.

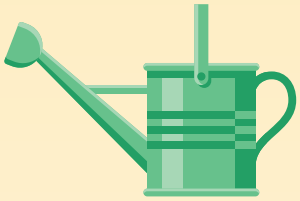
   There are _____ squares.

5. Now take out your colored pencils. We are going to color in certain parts of the chart to see if we notice any patterns. Color every number on the grid that ends with a zero green. Do you notice a pattern?

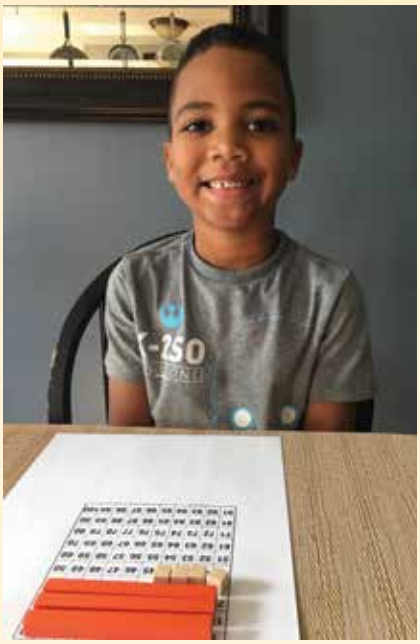
6. Color all the numbers that have a 4 at the end red. Do you notice a pattern? Talk with your parent about this.

Challenge!

Color each number whose digits add to ten blue. What pattern do you notice?



TENS AND ONES



You will Need:

- ☐ Base ten blocks
- ☐ Hundreds chart (in the back of answer key)

You Will Do:

1. Carefully tear out the hundreds chart from the answer key.
2. Use your base ten blocks to model the number 34 on your hundreds chart. First, cover the top three rows with ten rods. Now use 4 unit cubes to cover up 31, 32, 33, and 34.
3. Fill in the blanks below.

34 = _____ tens and _____ ones

4. Model each of the following numbers below by laying the base ten pieces on the hundreds chart.
5. Write in how many tens and ones are in each number.

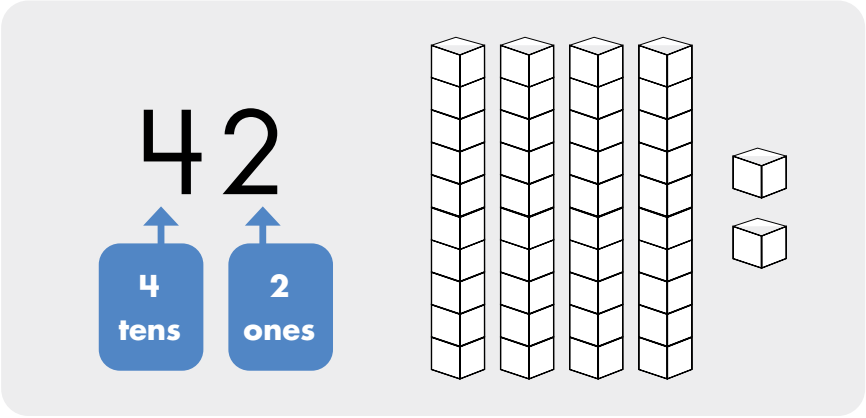
Number	Place Value
23	_____ tens and _____ ones
84	_____ tens and _____ ones
31	_____ tens and _____ ones

Place Value with Base Ten Blocks

Our numbering system uses groups of tens to help us keep track of large numbers. When we write numbers down we use symbols called digits. In the unit opening you saw some of the picture or letter symbols that other cultures used. In our system we can write any number using these ten different **digits**.

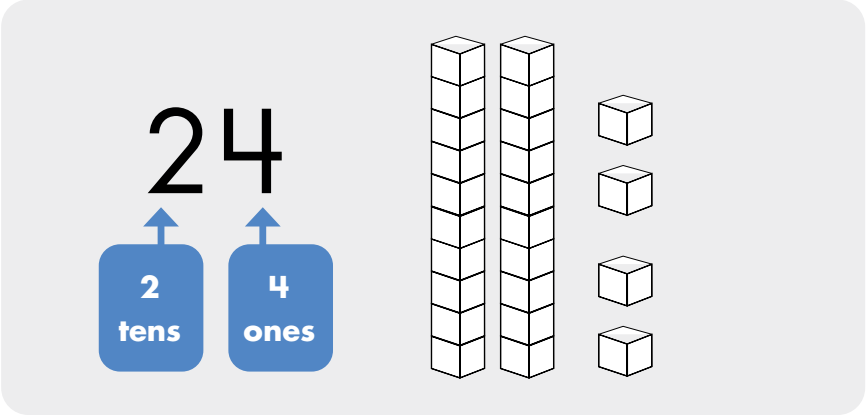
0 1 2 3 4 5 6 7 8 9

We use digits and **place value** to record numbers. Isn't it cool that we can write all numbers using just these ten digits? Place value just means that where you write a digit determines its value. Two-digit numbers have a tens place and ones place.



Digit: A symbol we use to write numbers.

If you switch the places of the digits you get a different number.

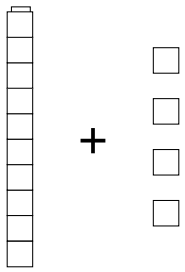


Place value: A system of writing numbers where the location of a digit affects its value.

Place value allows us to write large numbers using only a few digits.

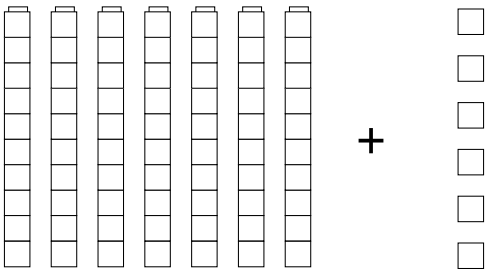
Practice

Use place value to write the numbers modeled with the base ten blocks. Count the ten rods first and write that number in the tens place. Then count the unit cubes and write that number in the ones place. Lastly, write the number using place value. The first one is done for you.

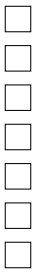


tens = 1 ones = 4

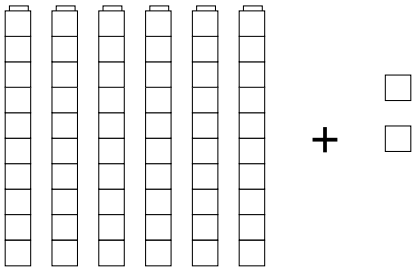
14



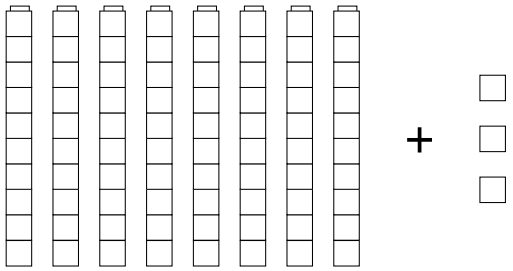
tens = ones =



tens = ones =

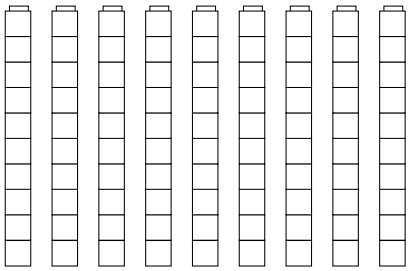


tens = ones =



tens = ☐ ones = ☐

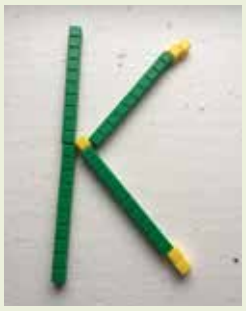
_____



tens = ☐ ones = ☐

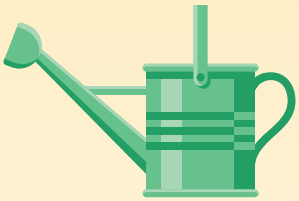
_____

Challenge!



Challenge: Make the first letter of your name using base ten blocks. If the first letter of your name has a curve use the single cubes to make the curve as best you can. When you are done add up all the base ten blocks. What is the value of the letter?

My letter equals _____ base ten blocks.



RIGHT DIGIT, RIGHT PLACE

You Will Need:

- [ ] Paper
- [ ] Pencil

You Will Do:

1. Have your parent pick a secret two-digit number. Your job is to guess their number.
2. Write your first guess in the left column.
3. Now your parent looks at your guess. They write down how many digits are correct and then how many of them are in the correct place. The sample game board above demonstrates this.
4. Continue guessing. If you realize a certain digit definitely isn't in the number then cross it off at the top. In the example, the student knew that neither 2 nor 5 was in the answer.

0 1 ~~2~~ 3 4 ~~5~~ 6 7 8 9		
Guess	Digit	Place
73	1	0
25	0	0
43	1	1
47	2	2

0 1 2 3 4 5 6 7 8 9		
Guess	Digit	Place

Expanded form: A way of writing numbers that shows the value of each digit.

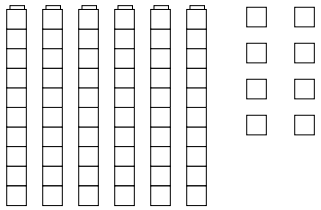
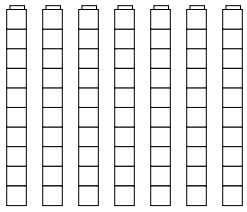
Expanded Form

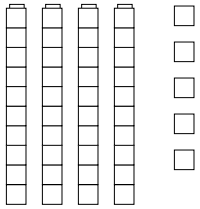
In the last lesson, you practiced using place value to write numbers that were represented with base ten blocks. Another way to write numbers is in expanded form. **Expanded form** shows the value of each digit. Look at the example below.

Standard Form	Expanded Form
47	40 + 7

Practice

Practice writing numbers in different forms by completing the table below. You can use lines and dots to draw the base ten blocks.

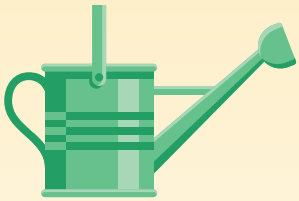
Number	Expanded Form	Base ten blocks
68	□ + □	
	20 + 1	
	□ + □	
53	□ + □	
	70 + 8	

Number	Expanded Form	Base ten blocks
45	☐ + ☐	
	60 + 6	
92	☐ + ☐	

Circle the value of the red digit.

32 2 20	29 2 20	34 3 30
51 1 10	72 2 20	83 8 80

NUMBER MATCHING CARDS



You Will Need:

- [ ] Lesson 4 Activity Sheets (in the back of the answer key)
- [ ] Scissors

You Will Do:

1. Carefully tear out the activity sheets from answer key.
2. Cut out the different puzzle pieces or have a parent help you.
3. Match the pieces together. There are four different pieces for each number.
4. When you have matched 4 pieces, check your answer with your parent.

Number Word Names

Sometimes we need to write out a number using words instead of digits. Practice reading the numbers in this chart out loud.

1 one	6 six
2 two	7 seven
3 three	8 eight
4 four	9 nine
5 five	10 ten

11 eleven	20 twenty
12 twelve	30 thirty
13 thirteen	40 forty
14 fourteen	50 fifty
15 fifteen	60 sixty
16 sixteen	70 seventy
17 seventeen	80 eighty
18 eighteen	90 ninety
19 nineteen	100 one hundred

Practice

Choose two numbers between 20 and 99. Write them on the chart below. Then write them in expanded form and write their word names. Two word numbers under 100 are hyphenated. For instance, 23 is written as twenty-three.

Number	Expanded Form	Word Name
	☐ + ☐	
	☐ + ☐	

Use your knowledge of place value to solve the following number riddles.

1. I am thinking of a secret number. It is between 50 and 60 and the tens digit and the ones digit are the same. Can you guess what my number is?

Tens digit	Ones digit

2. I am thinking of a secret number. The number is less than 80. The tens digit is six more than the ones digit. There are no zeros in my number. Can you guess what my number is?

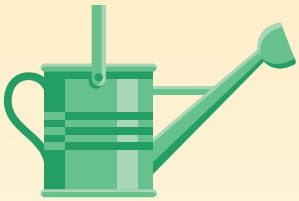
Tens digit	Ones digit

3. I am thinking of a secret number. This number is bigger than 40 and the ones digit is double the tens digit.

Tens digit	Ones digit

4. Conrad has 4 boxes of 10 markers each and 3 single markers. How many markers does Conrad have? You may want to draw a picture.

BUILD AND COMPARE



You Will Need:

- ☐ Base ten blocks

You will do:

1. Build each pair of numbers shown with base ten blocks on the mats below.
2. Look at just the ten rods first. Which number has more tens? The number with more tens is the greater number.
3. If the tens are the same, then look at the ones. The number with more ones is the greater number.
4. Circle the greater number in each pair.

Which is greater?

37	28
43	34
51	55
30	32
47	51

First number	
Tens	Ones

Second number	
Tens	Ones

Comparing Numbers

In the opening activity, you circled the greater number. Mathematicians have a special symbol to show that one number is greater than another. Here is an example:

$28 > 14$ "28 is greater than 14"

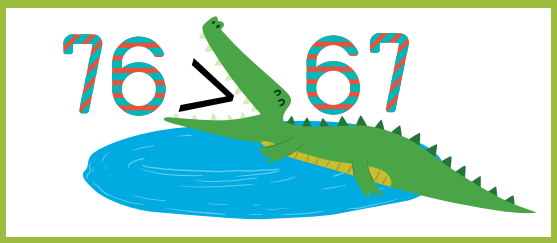
This symbol means "is greater than."

Notice that the side that is bigger is open toward the larger number. There is also a symbol for showing that one number is less than another. Here is an example:

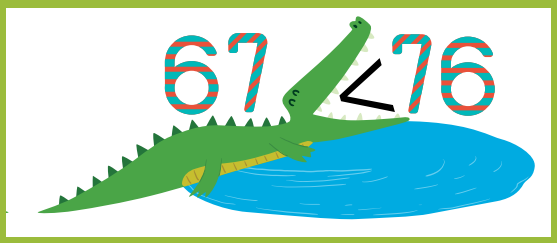
$41 < 78$ "41 is less than 78"

This symbol means "is less than."

Notice that the side that is smaller is closed and pointing toward the number that is smaller.



76 is greater than 67.



67 is less than 76.

Changing the direction of the sign changes its meaning. One way to remember is to imagine the symbol as the mouth of an alligator. The alligator always eats the larger number.

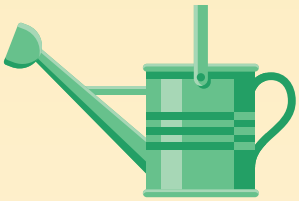
Practice

Use the < and > symbols to compare the numbers below. When you are deciding which number is greater, remember to look at the tens column first. It may help to first underline the number in the tens place in each number.

37 ◯ 23	28 ◯ 39
15 ◯ 76	10 ◯ 11
20 ◯ 30	87 ◯ 78
99 ◯ 97	15 ◯ 51

Write numbers in the blanks to make each number sentence true.

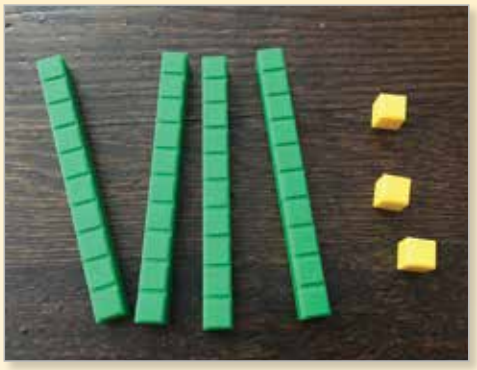
☐ < ☐ ☐ > ☐



BASE TEN CHALLENGE

You Will Need:

- ☐ Base ten blocks (all 10 ten rods and all 100 cubes)



You Will Do:

1. Your challenge today is to represent the number 43 using base ten blocks. The challenge is that you need to do it in 5 different ways. The first way will probably be the easiest for you. Use the rods and unit cubes to show 43. Draw a sketch of what you did in the box provided.
2. Now try building the number again with the blocks in a different way. Break down the number by substituting 10 ones for 1 ten rod.
3. Continue modeling with the blocks and sketching a picture of your answer in the spaces provided. See if you can find all 5 possibilities.

Representation #1	Representation #2	Representation #3	Representation #4	Representation #5

Putting Numbers in Order

In the last lesson, you compared numbers by looking at the tens place first. You can use the same strategy to put several numbers in order from least to greatest.

Step One: Look at the digits in the tens place. Rearrange the numbers from least to greatest according to their tens digits.

Step Two: If any of the number have the same tens digit, then look at the ones place. Change the order if you need to.

Practice

You can use the steps above to put these numbers in order from least to greatest. Underline each tens digit. If more than one number has the same tens digit, circle the ones digit to see which is smaller. Write your answers on the spaces provided.

17, 19, 52, 35, 42

_____, _____, _____, _____, _____

84, 92, 73, 38, 71

_____, _____, _____, _____, _____

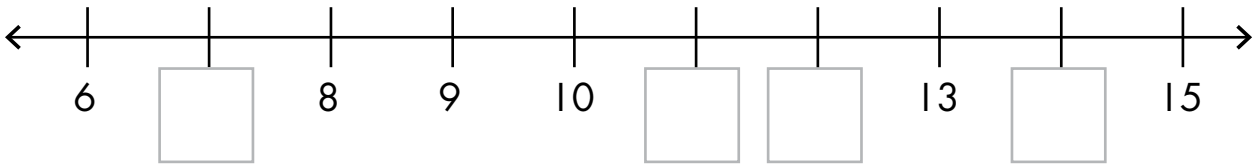
77, 80, 56, 73, 19

_____, _____, _____, _____, _____

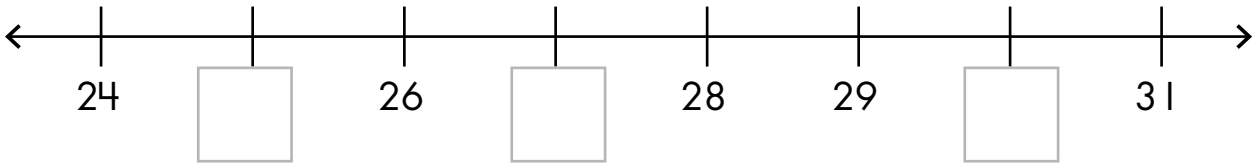
Practice

Another tool mathematicians use to show the order of numbers is a number line. Fill in the missing numbers on the number lines below.

1.



2.



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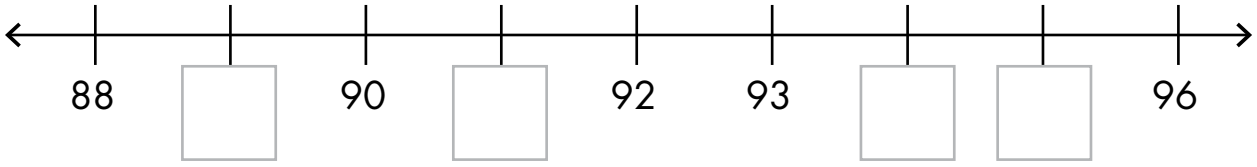
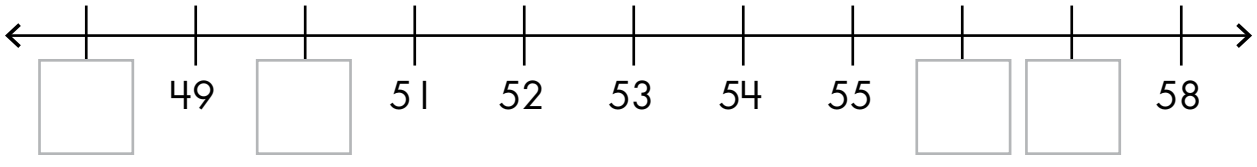


4.



FIND YOUR PARTNER

You Will Need:

- [ ] 20 linking cubes
- [ ] Colored pencils (to be used later)

You Will Do:

1. 6 children are playing a game. They each need a partner. Will every child have a partner?
2. Use your linking cubes to act out the scenario. Start with 6 cubes. Snap the cubes together to show the pairs of children. Will they each have a partner? Tell your parent.
3. 5 children are playing a game. They each need a partner. Will every child have a partner?
4. Use your linking cubes to act out the scenario. Start with 5 cubes. Snap the cubes together to show the pairs of children. Will they each have a partner? Tell your parent.
5. Continue acting out the scenario for different numbers of children and record your results by filling in the table below. Do you notice any patterns?

Number of children	Does everyone have a partner?	Draw a picture of what happened when you made the pairs.
1		
2		
3		

Number of children	Does everyone have a partner?	Draw a picture of what happened when you made the pairs.
4		
5		
6		
7		
8		
9		
10		

Even and Odd Numbers

The groups where everyone had a partner in the opening activity were all **even numbers**. Even numbers can be grouped evenly in pairs. The groups where one child didn't have a partner were all **odd numbers**. When you try to make pairs with an odd number there will always be one left over.

Color the even numbers red on the strip below. Color the odd numbers blue. Look at what happened in the opening activity if you are not sure whether a number is even or odd.

1	2	3	4	5	6	7	8	9	10

What pattern do you notice?
Tell your parent.

Based on that pattern, do you think the number 11 will be even or odd?
Circle you guess below in pencil.

11

even odd

Count out 11 linking cubes to check your answer. Can you group them into pairs with no cube leftover? If so, then 11 is even. If not, then it is an odd number. Change your answer if you need to make it correct.

Practice

Circle whether each of these numbers is even or odd. Then check your answer with linking cubes. Fix any answers that are incorrect.

12	even	odd	17	even	odd
13	even	odd	18	even	odd
14	even	odd	19	even	odd
15	even	odd	20	even	odd
16	even	odd			

Mom finds 7 socks in the laundry. Will every sock have a match? Why or why not? Draw a picture to explain your answer.

TOWER PAIRS

You will Need:

- ☐ 20 linking cubes

You Will Do:

1. Count out 10 linking cubes. Use the cubes to build two towers that are the same height. How many cubes are in each tower?

   _____ cubes in each tower.

2. Count out 18 linking cubes. Use the cubes to build two towers that are the same height. How many cubes are in each tower?

   _____ cubes in each tower.

3. Count out 14 linking cubes. Use the cubes to build two towers that are the same height. How many cubes are in each tower?

   _____ cubes in each tower.

4. Count out 9 linking cubes. Can you build two towers that are the same height? Why or why not? Tell your parent.

5. Give some examples of numbers like 10 and 14 that you could use to build two towers that are the same height.

6. Give some examples of numbers like 9 that you could **NOT** use to build two towers that are the same height.

Even and Odd Practice

The numbers that you used to build 2 towers of the same height are all even numbers. Look at the number 12, for instance. Twelve is an even number. It can be split into 2 equal groups of 6.

12 6 + 6 = 12

If you started with an odd number of linking cubes - like 9, 11, or 5 - you couldn't build 2 towers that were the same height. One tower would always be one cube higher.

Practice

Each of the numbers below is even. Write a number sentence showing how the number can be split into two equal groups. If you need help, use your linking cubes and build two towers like you did in the opening activity.

4	☐ + ☐ = 4	14	☐ + ☐ = 14
6	☐ + ☐ = 6	18	☐ + ☐ = 18
10	☐ + ☐ = 10	20	☐ + ☐ = 20

Odd numbers cannot be split into two equal groups. There will always be one left over. Look at these number sentences where the solutions are odd numbers.

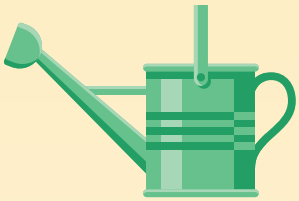
$7 \longrightarrow 3 + 3 + 1 = 7$

$11 \longrightarrow 5 + 5 + 1 = 11$

Practice

Write number sentences for each of these odd numbers. If you need help, use your linking cubes and build two towers like you did in the opening activity. You will have one cube leftover.

5	$\square + \square + 1 = 5$
9	$\square + \square + 1 = 9$
13	$\square + \square + 1 = 13$
17	$\square + \square + 1 = 17$



FINAL DIGITS

You Will Need:

- [ ] Colored pencils

You Will Do:

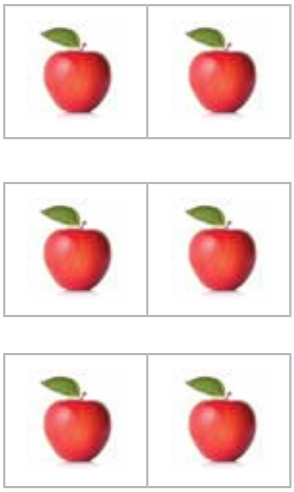
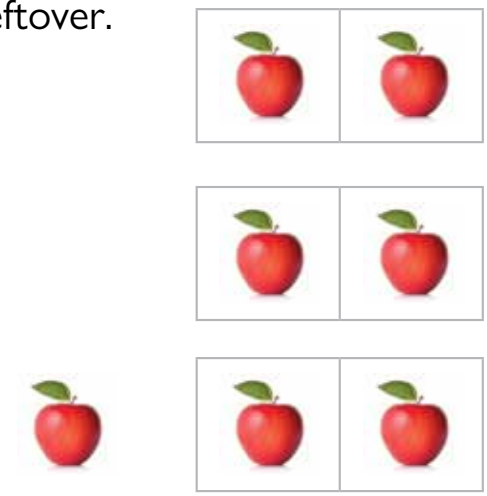
1. Look at the hundreds chart below. Color all the numbers that have a 2 as their final digit red.
2. Color all the numbers that have a 4 as their final digit blue.
3. Color all the numbers that have a 6 as their final digit green.
4. Color all the digits that have an 8 as their final digit purple.
5. Color all the digits that have a zero as their final digit yellow.
6. Look at all the squares that are colored in. Do you notice a pattern?

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

More Even and Odd Practice

All even numbers end with the digit 2, 4, 6, 8, or 0. This is why in the opening activity you ended up coloring in all the even numbers. Odd numbers end with the digit 1, 3, 5, 7, or 9.

We now know several different things about even and odd numbers. The chart below will help you review.

Even numbers	Odd Numbers
Last digit is 2, 4, 6, 8, or 0	Last digit is 1, 3, 5, 7, or 9
Can be divided into two equal groups.	If you try to divide it into two equal groups there will be one left over.
Can be grouped evenly in pairs. 	Cannot be grouped evenly in pairs. There will always be one leftover. 

Practice

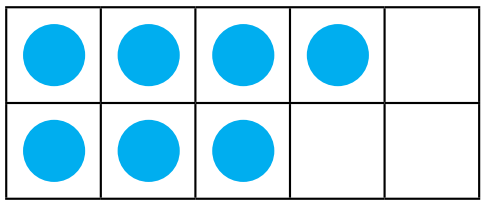
Use what you know about the last digits of even and odd numbers to decide if each number below is even or odd. If you get stuck you can also look back at the hundreds chart you colored.

21	even	odd	27	even	odd
42	even	odd	31	even	odd
45	even	odd	50	even	odd
80	even	odd	75	even	odd
99	even	odd	72	even	odd

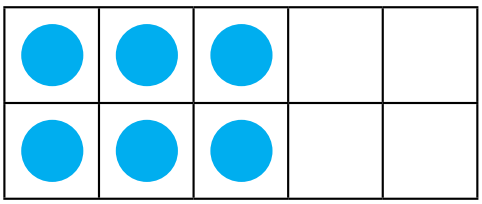
Give 3 examples of two-digit odd numbers.

Practice

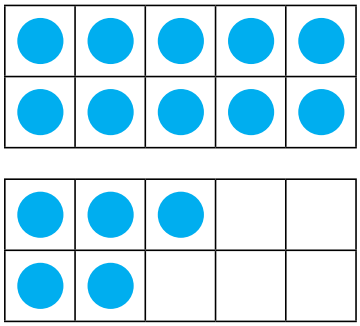
Look at the ten frames. Circle whether they show an even or an odd number.



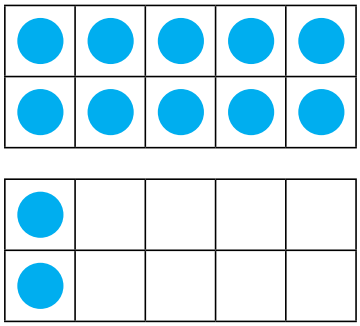
even odd



even odd



even odd

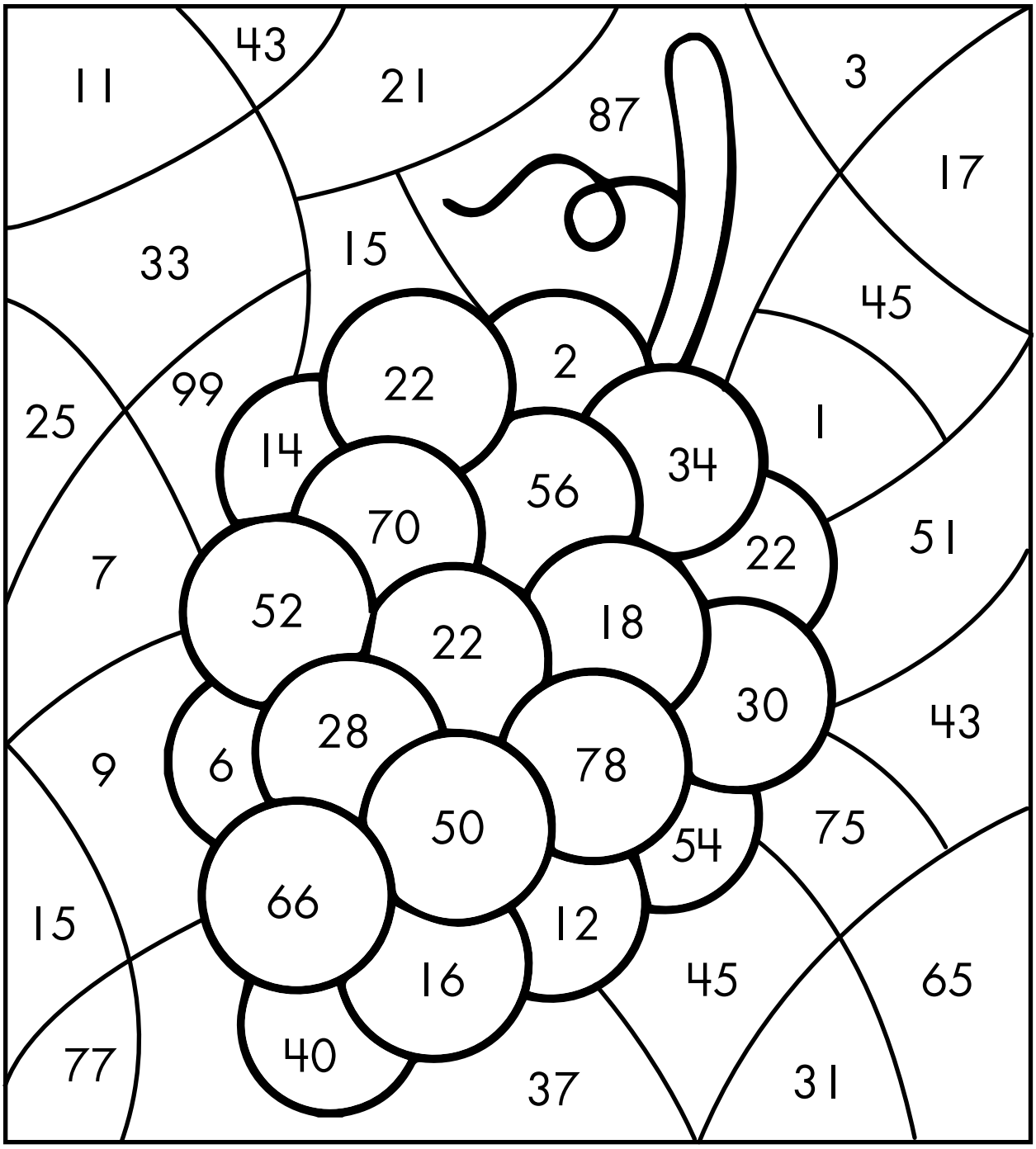


even odd

Give 3 examples of two-digit even numbers.

Practice

Color the even numbers in the picture purple and the odd numbers blue to see what Anna's favorite snack is.



2
LEVEL

apologia

EXPLORING CREATION WITH

MATHEMATICS

TEACHING GUIDE & ANSWER KEY

Kathryn Gomes

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WEEK-BY-WEEK DAILY SCHEDULE

Below is a suggested weekly schedule to help you stay on track. It uses a four-day week to leave room for a co-op day or a review day. Please feel free to adjust it to the needs of your child and your family's calendar. Since the suggested schedule covers 28 weeks, there is plenty of room for personal modifications

WEEK	DAY 1	DAY 2	DAY 3	DAY 4
1	UNIT 1 Intro CHAPTER 1 Lesson 1 Skills practice: doubles facts	CHAPTER 1 Lesson 2 Skills practice: doubles facts	CHAPTER 1 Lesson 3 Skills practice: doubles facts	CHAPTER 1 Lesson 4 Skills practice: doubles facts
2	CHAPTER 1 Lesson 5 Skills practice: doubles plus or minus one	CHAPTER 1 Lesson 6 Skills practice: doubles plus or minus one	CHAPTER 1 Lesson 7 Skills practice: doubles plus or minus one	CHAPTER 1 Lesson 8 Skills practice: doubles plus or minus one
3	CHAPTER 1 Lesson 9 Skills practice: addition and subtraction facts within 10	CHAPTER 2 Lesson 10 Skills practice: addition and subtraction facts within 10	CHAPTER 2 Lesson 11 Skills practice: addition and subtraction facts within 10	CHAPTER 2 Lesson 12 Skills practice: addition and subtraction facts within 10

TEACHER'S NOTES

UNIT 1: NUMBER SENSE AND PLACE VALUE

SUPPLY LIST

Skills Practice:

- Flashcards
- LEGO® bricks
- Dominoes
- Dice

Chapter 1:

- Timer
- Colored pencils
- Tape or glue
- Scissors
- Base ten blocks
- Linking cubes

Chapter 2:

- Fifty small objects (such as pennies, beans, etc.)
- Three dice
- Base ten blocks
- A bag of beans (or about 200 other small objects)
- Ruler or tape measure

Unit one focuses on number sense and takes students to a deeper level of understanding than what they covered in first grade. Th e is a good amount of play in this unit; they will be trying out diffe ent things with numbers and experimenting with what happens. This kind of exploration leads to a strong foundation in mathematics.

The text was written assuming ou will be sitting alongside of your child to help them. Diffe ent kids will demonstrate diffe ent levels of independence, but a second grader is not expected to read and complete the student book on his or her own.

The e are additional resources for this program on the Book Extras Website. For login information and the password turn to page 10 in the student book.

SKILLS PRACTICE FOR UNIT ONE: FACTS FROM FIRST GRADE

All of the facts in the unit one skills practice are a review from first grade. We want to sharpen these skills before unit two when students will be relying on rapid recall of these basic facts, so they can complete two-digit addition and subtraction problems. For many of these, a few minutes with flashca ds is going to be your best option.

Skill One: Doubles facts

This g oup of facts is often easier to master because of the symmetry. Something about doubles facts is just appealing. Use them as a benchmark for learning other facts.

1 + 1 = 2	4 + 4 = 8	7 + 7 = 14	10 + 10 = 20
2 + 2 = 4	5 + 5 = 10	8 + 8 = 16	
3 + 3 = 6	6 + 6 = 12	9 + 9 = 18	

1. Flashcards. Pull out just the doubles facts and rehearse them.
2. Domino fact practice. Select only the dominoes that have the same amount of dots on both sides. Write down the numbers 0, 2, 4, 6, 8, 10, 12 on a sheet of paper. Have your child match each domino with the correct sum. If your set of dominoes goes above 12 you can include those sums as well.

Skill Two: Doubles plus or minus one

Using the doubles facts as a reference, we will now practice the facts that are one more or one less. Here are the facts you need to practice:

0 + 1 = 1	5 + 6 = 11	1 + 0 = 1	6 + 5 = 11
1 + 2 = 3	6 + 7 = 13	2 + 1 = 3	7 + 6 = 13
2 + 3 = 5	7 + 8 = 15	3 + 2 = 5	8 + 7 = 15
3 + 4 =7	8 + 9 =17	4 + 3 = 7	9 + 8 = 17
4 + 5 = 9	9 + 10 = 19	5 + 4 = 9	10 + 9 = 19

1. Flashcards. Add the facts on the bottom of page 14 in with the doubles and continue to practice.
2. Play the Doubles Plus or Minus One game in lesson 24. You can print an extra copy of the game board off of the Book xtras website.

Skill Th ee: Addition and subtraction facts within 10

Many of these addition facts were already covered but now we are adding in subtraction facts too. This is a gentle eview. We will be tackling all the facts within 20 in unit two. Be sure that students are practicing them backwards and forwards and in a horizontal and a vertical format.

Addition facts

1 + 3 = 4	1 + 7 = 8	2 + 5 = 7	3 + 5 = 8
1 + 4 = 5	1 + 8 = 9	2 + 6 = 8	3 + 6 = 9
1 + 5 = 6	1 + 9 = 10	2 + 7 = 9	3 + 7 = 10
1 + 6 = 7	2 + 4 = 6	2 + 8 = 10	4 + 6 = 10

Subtraction facts

10 – 10 = 0	9 – 4 = 5	7 – 5 = 2	5 – 2 = 3
10 – 9 = 1	9 – 3 = 6	7 – 4 = 3	5 – 1 = 4
10 – 8 = 2	9 – 2 = 7	7 – 3 = 4	5 – 0 = 5
10 – 7 = 3	9 – 1 = 8	7 – 2 = 5	4 – 4 = 0
10 – 6 = 4	9 – 0 = 9	7 – 1 = 6	4 – 3 = 1
10 – 5 = 5	8 – 8 = 0	7 – 0 = 7	4 – 2 = 2
10 – 4 = 6	8 – 7 = 1	6 – 6 = 0	4 – 1 = 3
10 – 3 = 7	8 – 6 = 2	6 – 5 = 1	4 – 0 = 4
10 – 2 = 8	8 – 5 = 3	6 – 4 = 2	3 – 3 = 0
10 – 1 = 9	8 – 4 = 4	6 – 3 = 3	3 – 2 = 1
10 – 0 = 10	8 – 3 = 5	6 – 2 = 4	3 – 1 = 2
9 – 9 = 0	8 – 2 = 6	6 – 1 = 5	3 – 0 = 3
9 – 8 = 1	8 – 1 = 7	6 – 0 = 6	2 – 2 = 0
9 – 7 = 2	8 – 0 = 8	5 – 5 = 0	2 – 1 = 1
9 – 6 = 3	7 – 7 = 0	5 – 4 = 1	2 – 0 = 2
9 – 5 = 4	7 – 6 = 1	5 – 3 = 2	1 – 1 = 0

1. Flashcards. Include all addition and subtraction facts within 10.
2. Play Toppling Towers of 10 to practice subtraction. The inst uctions for this activity are included below.
3. Practice grouping facts according to their answers. Label several sheets of paper with the numbers 0–10. Have your child stack the flashca ds on top of the paper with the correct answer. They can use both addition and subtraction facts in this practice. You can also do this with dominoes to practice just addition.

Toppling Towers of 10

You Will Need:

- ☐ Ten LEGO bricks (or linking cubes) per player
- ☐ A die

You Will Do:

The object of the game is to take down your opponent's tower before he or she takes down yours.

1. Each player starts by building a tower of 10.
2. The first player rolls the die. He or she removes that number of LEGO bricks from another player's tower while saying the subtraction sentence out loud. For example, "Ten minus 3 is 7."
3. Players continue taking turns rolling the die and removing that number of LEGO bricks from another player's tower.
4. You must roll the exact amount to take another player's tower all the way down to zero. For instance, if your brother has 3 LEGO bricks left and you roll a 4, you cannot take away his 3 LEGO bricks. When a player has lost an entire tower, he or she is out.
5. The last player remaining wins.

Skill Four: Identifying even and odd numbers

These a e introduced at the end of chapter 1, but it is worth circling back for some spaced repetition while your child is working through the lessons in chapter 2.

1. Practice with groups of objects. Place a group of beans on the table and ask students to determine if it is an even or odd amount. Repeat with a variety of amounts. Talk with them about how they arrived at their answer (or why they got stuck). Most kids will figu e it out by making pairs and seeing if there are any left over.
2. Give your child a set of numbered cards. You can purchase these or make them yourself. Have your child sort them into 2 piles: even and odd. Start with just the numbers 1–20 and work up to include numbers up to 100 so that your child masters the concept of looking at just the final digit
3. Check out your library to see if it has any math books like *Even Steven, Odd Todd* by Kathryn Cristaldi.

CHAPTER 1: NUMBER SENSE AND PLACE VALUE

LESSON 1

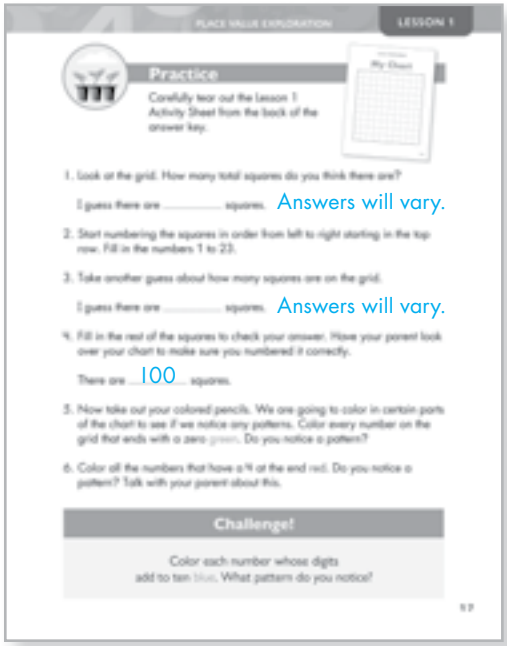
In the opening activity, students draw as many stars as they can in a minute and then count them up. Some students might just count up the stars one by one. Others might group them by fi es or tens. Talk with your child about diffe ent strategies and their advantages. The discussion is more important than the specific strateg . We want to develop mathematicians who are comfortable using a variety of strategies and who know how to choose the best one for a certain problem. That flexibility and l el of expertise are developed at the elementary level through exposure to many diffe ent approaches to the same task and discussion about these diffe ent approaches.

Place value is one of the key concepts in second grade, so it is important that students develop a firm grasp of what place alue is and how it functions in our numbering system. The patterns in the hund eds chart help them discover these relationships. And of course, there are always more patterns to be found if they want to keep looking.

The challenge uses the ocabulary word "digit" so that students can explore something more in depth on the chart. This ocabulary word will be further explained and defined in lesson 2

Take it Further: Color all the numbers that have the same digits purple. What pattern do you notice?

Page 17 Answers

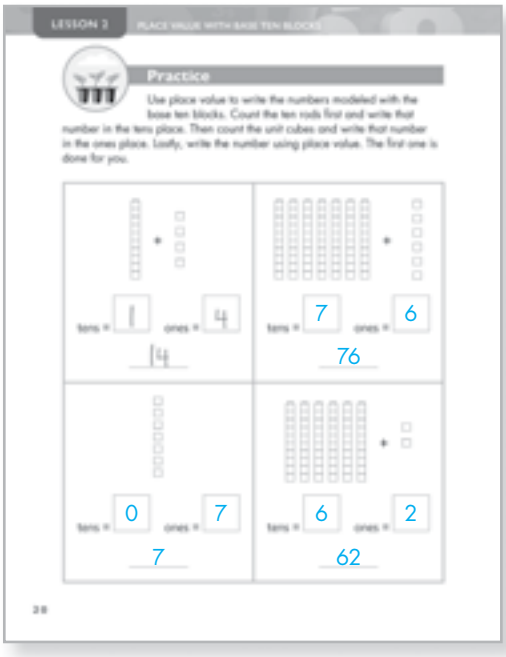


LESSON 2

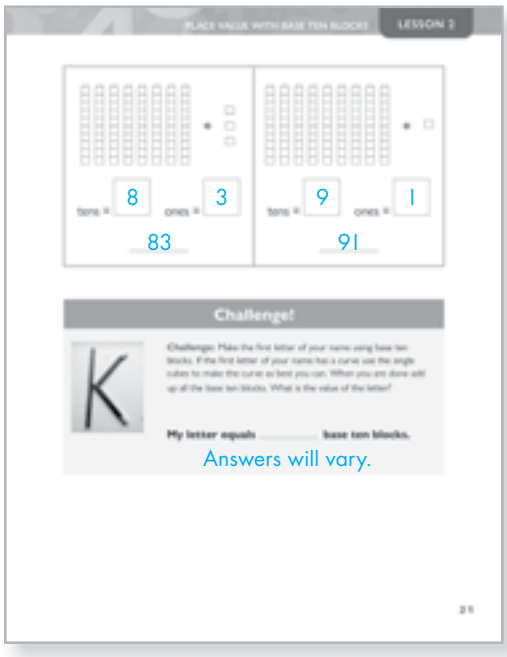
The opening activity helps them make a neat connection between their base ten blocks and the hundreds chart. The challenge at the end of this lesson introduces an element of play. Any time you catch your kids playing with math manipulatives encourage them to continue. Kids often discover relationships between numbers while casually exploring.

Page 18 Answers

Page 20 Answers



Page 21 Answers

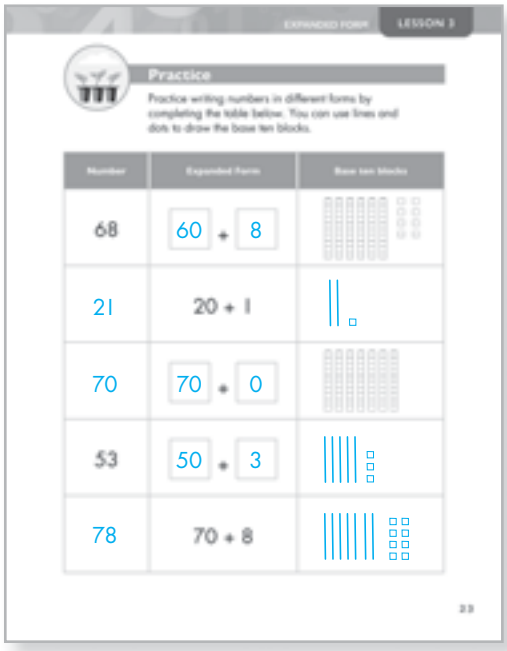


LESSON 3

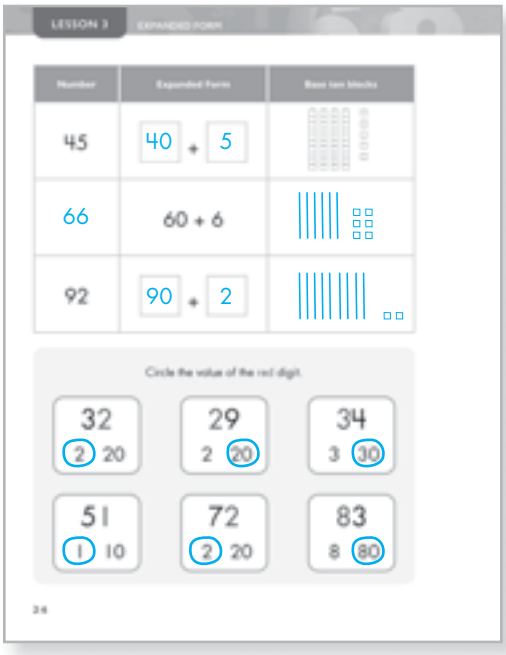
In the opening activity, we have you think of the secret number. With some practice, your child will be able to discover the secret number. But for now, we didn't want the game to be too hard for them. Also, don't be discouraged if their guesses are illogical. Play the game several times and see if they start to realize how they can guess more efficient .

Expanded form develops the important concepts behind place value that are especially important when we start adding and subtracting in unit two.

Page 23 Answers



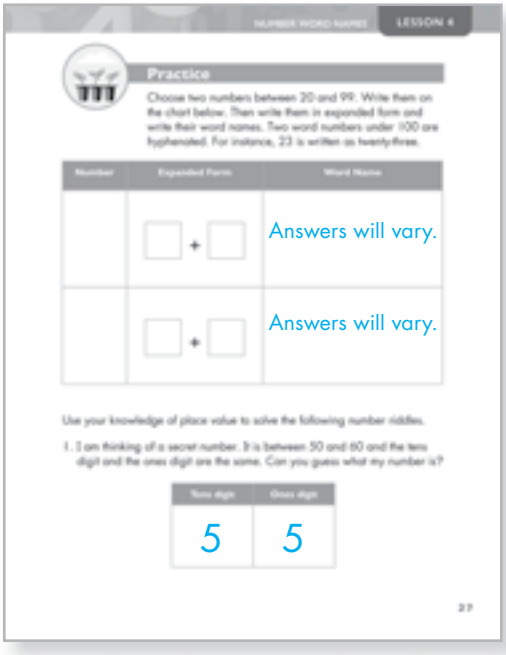
Page 24 Answers



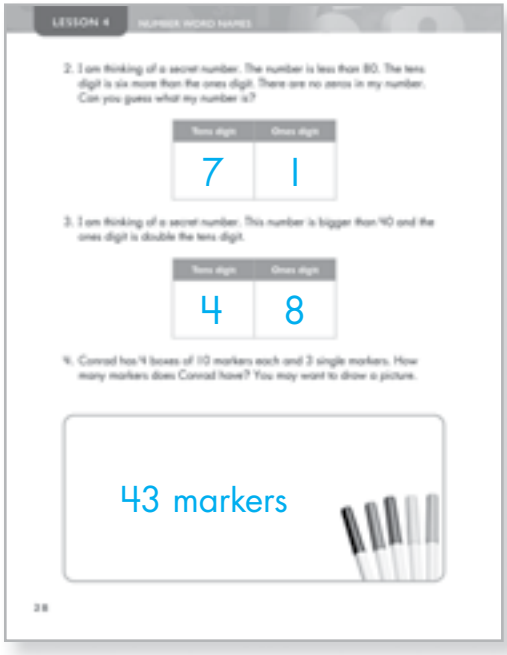
LESSON 4

Keep the matching cards from the opening activity in an envelope if your child needs more practice in the future.

Page 27 Answers



Page 28 Answers

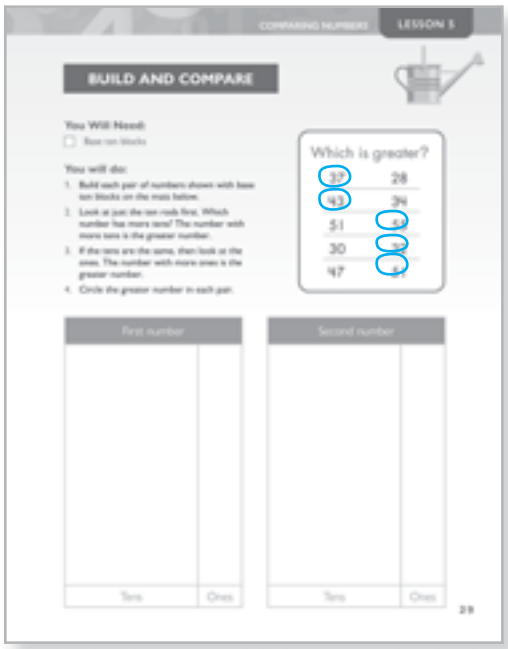


LESSON 4: NUMBER MATCHING CARDS ANSWERS

LESSON 5

Getting the direction of the inequality correct is harder for most students than deciding which number is greater. If they make a mistake on the practice ask them to point to the greater number for you. If they get that right then you know they are just struggling with the inequality sign. Learning to write notation and symbols correctly is a key skill in mathematics. Your child is essentially learning to write in a new language, the language of mathematics.

Page 29 Answers



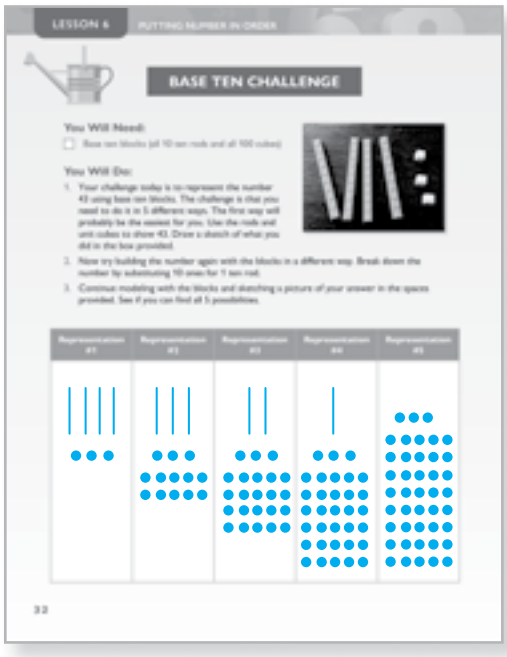
Page 31 Answers

LESSON 6

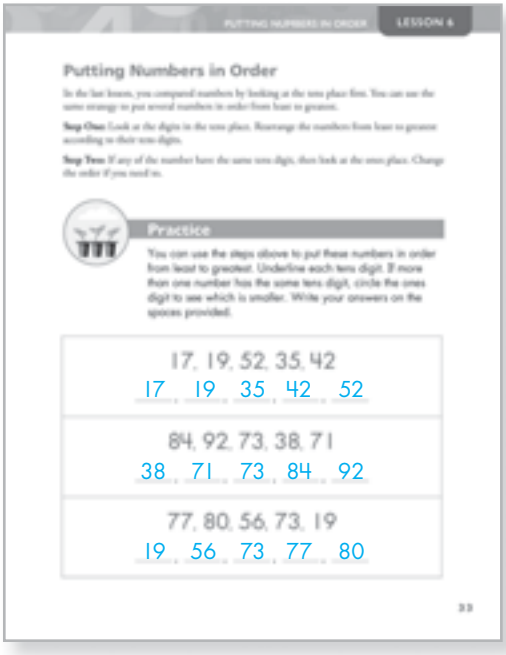
Did you lose a few of those unit cubes? The same thing happens at our house. You could also use some other small objects and substitute them for the cubes as long as your child understands that each item represents one. Even if you have a complete set, you won't have enough unit cubes to make all 5 representations at the same time, that's why we have them sketch a picture of each representation.

If your child struggles with putting the numbers in order try writing each number on a slip of paper. Many kids have an easier time if they can physically move the numbers around and correct a mistake without having to erase.

Page 32 Answers



Page 33 Answers



Putting Numbers in Order

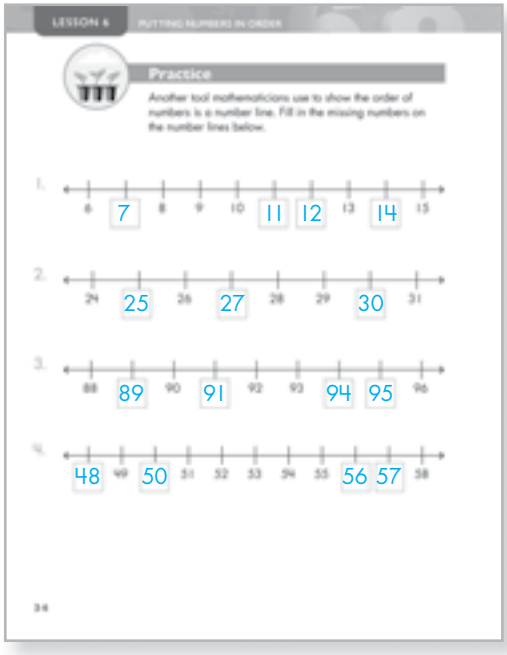
Practice

17, 19, 52, 35, 42
17 19 35 42 52

84, 92, 73, 38, 71
38 71 73 84 92

77, 80, 56, 73, 19
19 56 73 77 80

Page 34 Answers



Practice

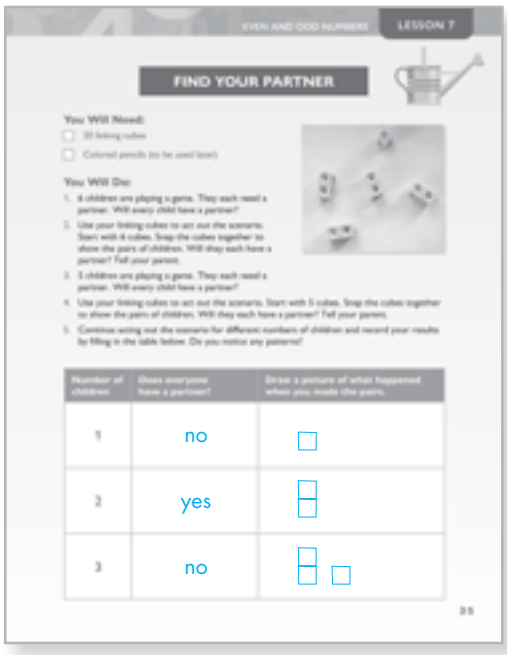
Another tool mathematicians use to show the order of numbers is a number line. Fill in the missing numbers on the number lines below.

1. 6 7 8 9 10 11 12 13 14 15
2. 24 25 26 27 28 29 30 31
3. 88 89 90 91 92 93 94 95 96
4. 48 49 50 51 52 53 54 55 56 57 58

LESSON 7

Students need a good amount of practice with the concepts of even and odd so that it can really sink in. The next three lessons develop this concept. Whenever possible, talk about even and odd amounts throughout the day. Pairs of shoes and socks are one my favorite examples. We normally are missing a sock in the laundry so that works out well for the odd number. Markers and their caps can also work well as an example.

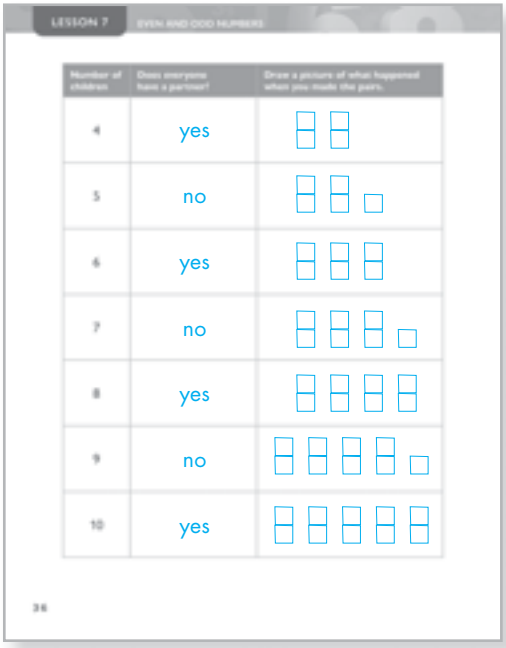
Page 35 Answers



FIND YOUR PARTNER

1	no	☐
2	yes	☐☐
3	no	☐☐☐

Page 36 Answers

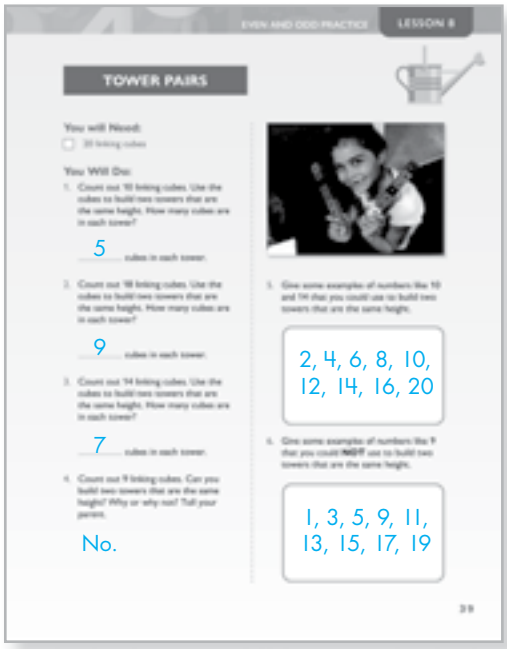


Page 38 Answers

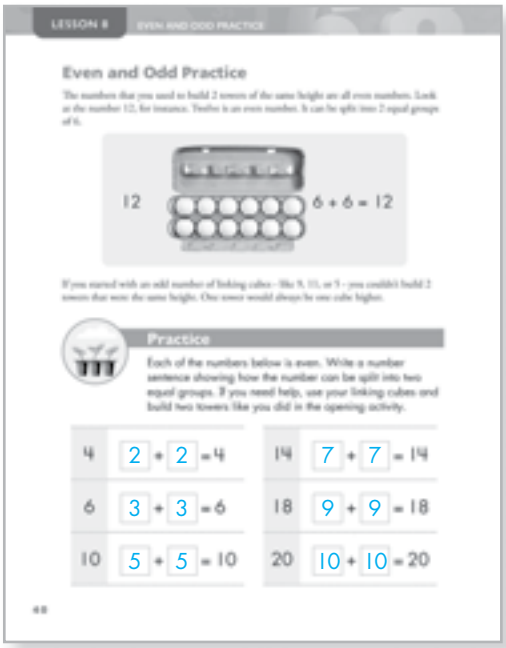
LESSON 8

This lesson de elops the idea of evens and odds in a new way. We want students to see that all even numbers can be broken down into a doubles fact and all odds are a doubles fact plus one more.

Page 39 Answers



Page 40 Answers



LESSON 8 EVEN AND ODD PRACTICE

Even and Odd Practice

The numbers that you used to build 2 towers of the same height are all even numbers. Look at the number 12, for instance. Twelve is an even number. It can be split into 2 equal groups of 6.

12 — 6 + 6 = 12

If you started with an odd number of linking cubes - like 9, 11, or 5 - you couldn't build 2 towers that were the same height. One tower would always be one cube higher.

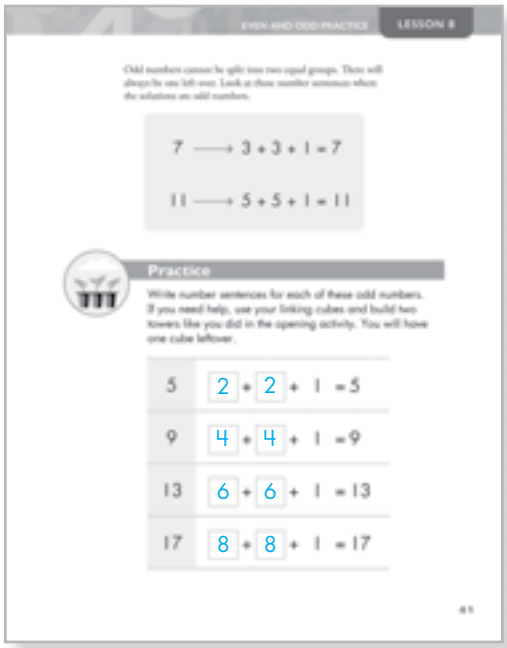
Practice

Each of the numbers below is even. Write a number sentence showing how the number can be split into two equal groups. If you need help, use your linking cubes and build two towers like you did in the opening activity.

4	2 + 2 = 4	14	7 + 7 = 14
6	3 + 3 = 6	18	9 + 9 = 18
10	5 + 5 = 10	20	10 + 10 = 20

40

Page 41 Answers



EVEN AND ODD PRACTICE LESSON 8

Odd numbers cannot be split into two equal groups. There will always be one left over. Look at these number sentences where the solutions are odd numbers.

7 ⟶ 3 + 3 + 1 = 7

11 ⟶ 5 + 5 + 1 = 11

Practice

Write number sentences for each of these odd numbers. If you need help, use your linking cubes and build two towers like you did in the opening activity. You will have one cube leftover.

5	2 + 2 + 1 = 5
9	4 + 4 + 1 = 9
13	6 + 6 + 1 = 13
17	8 + 8 + 1 = 17

41

LESSON 9

Spend some time reviewing the chart on p. 42. It pulls together all the diffe ent ideas behind evens and odds that we have covered.

Page 42 Answers

LESSON 9 MORE EVEN AND ODD PRACTICE

FINAL DIGITS

You Will Need:

- Colored pencils

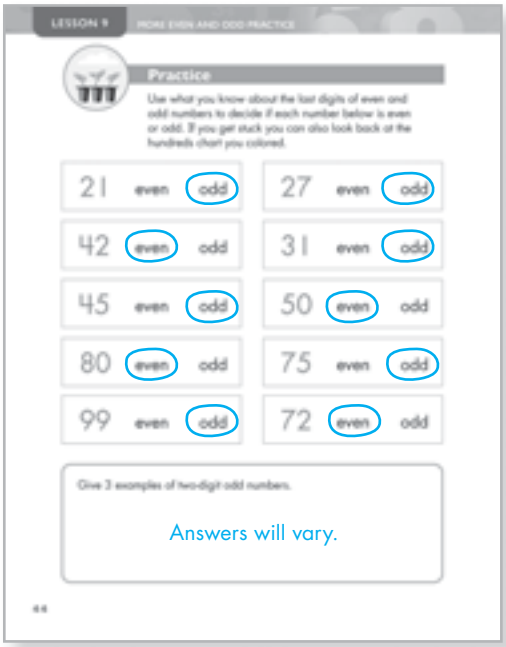
You Will Do:

1. Look at the hundreds chart below. Color all the numbers that have a 2 as their final digit red.
2. Color all the numbers that have a 4 as their final digit blue.
3. Color all the numbers that have a 6 as their final digit green.
4. Color all the digits that have an 8 as their final digit purple.
5. Color all the digits that have a zero as their final digit yellow.
6. Look at all the squares that are colored in. Do you notice a pattern?

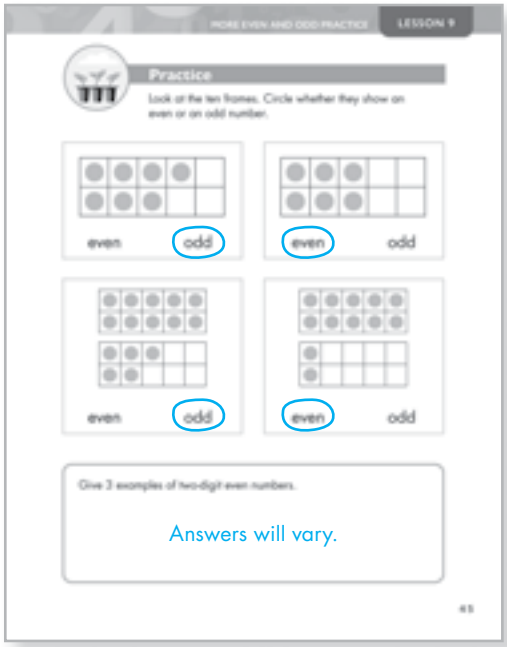
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

42

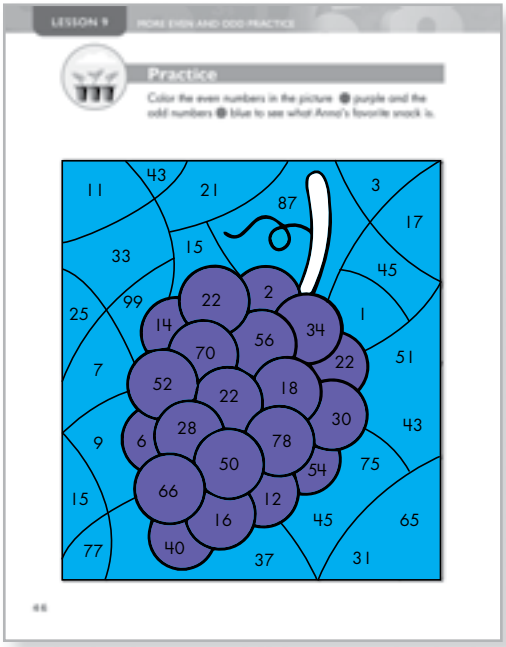
Page 44 Answers



Page 45 Answers



Page 46 Answers



CHAPTER 2: NUMBERS TO 1000

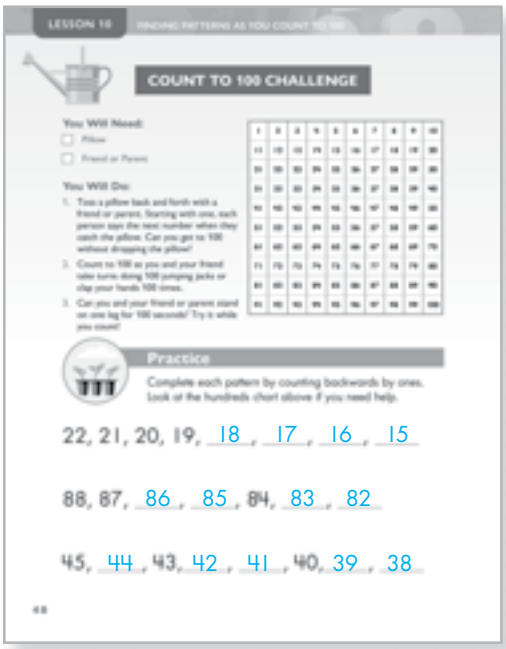
LESSON 10

For the opening activity, students can also practice counting to 100 along to music. Some fun links are on the Book Extras website to help with this.

Take it Further: For an added challenge try counting backwards from 100.

The hund eds chart puzzles help kids to think logically and to make sense out of the patterns in the hundreds chart. We continually review these patterns because they help students make connections between one or 10 more and place value.

Page 48 Answers


LESSON 10

COUNT TO 100 CHALLENGE

You Will Need:

- Pillow
- Friend or Parent

You Will Do:

1. Toss a pillow back and forth with a friend or parent. Starting with one, each person says the next number when they catch the pillow. Can you get to 100 without dropping the pillow?
2. Count to 100 as you and your friend take turns doing 100 jumping jacks or clap your hands 100 times.
3. Can you and your friend or parent stand on one leg for 100 seconds? Try it while you count!

Practice

Complete each pattern by counting backwards by ones. Look at the hundreds chart above if you need help.

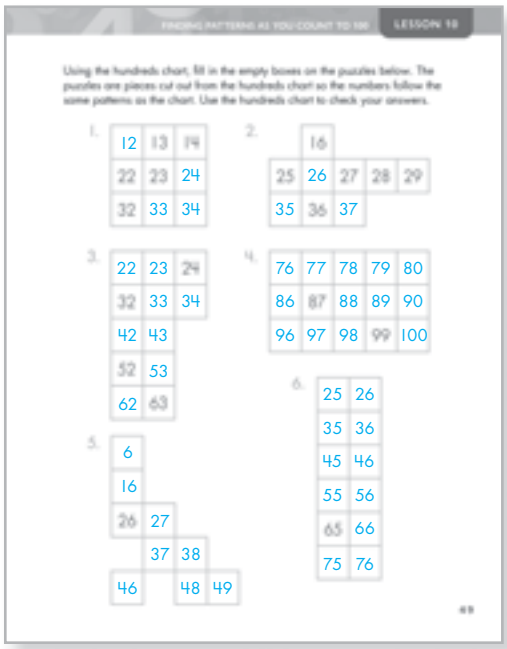
22, 21, 20, 19, 18, 17, 16, 15

88, 87, 86, 85, 84, 83, 82

45, 44, 43, 42, 41, 40, 39, 38

48

Page 49 Answers


LESSON 10

Using the hundreds chart, fill in the empty boxes on the puzzles below. The puzzles are pieces cut out from the hundreds chart so the numbers follow the same patterns as the chart. Use the hundreds chart to check your answers.

1.

12	13	14
22	23	24
32	33	34

2.

		16		
25	26	27	28	29
35	36	37		

3.

22	23	24
32	33	34
42	43	
52	53	
62	63	

4.

76	77	78	79	80
86	87	88	89	90
96	97	98	99	100

5.

	6	
	16	
26	27	
	37	38
46	48	49

6.

25	26
35	36
45	46
55	56
65	66
75	76

49

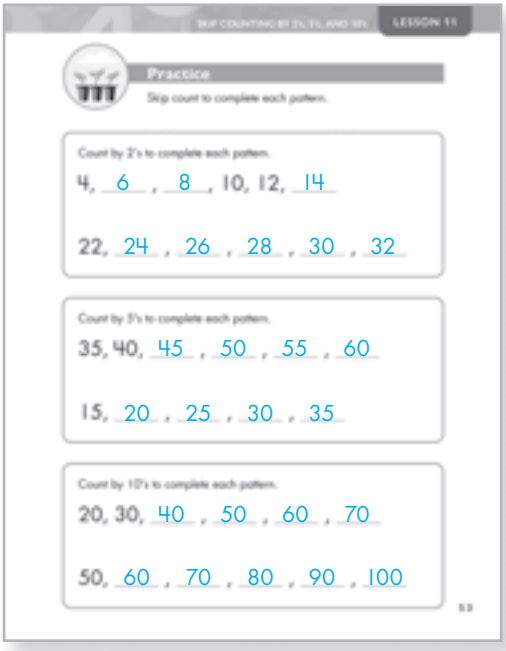
LESSON 11

The opening activity in this lesson is much longer than in most lessons. That is because the bulk of the learning about skip counting happens in the activity. Feel free to take your time and to repeat steps if needed. If you are using something like beans that can roll away, it can be helpful to use an egg carton or small cups to contain the groups. Linking cubes also work really well because you can snap them into groups of 2, 5, or 10.

Page 51 Answers

Page 52 Answers

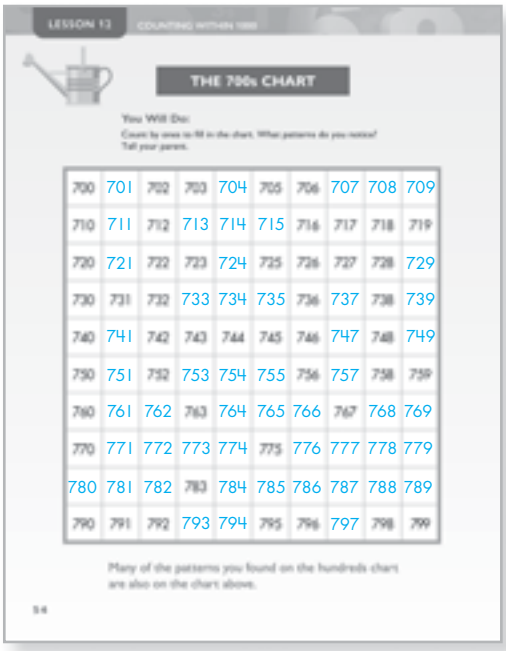
Page 53 Answers



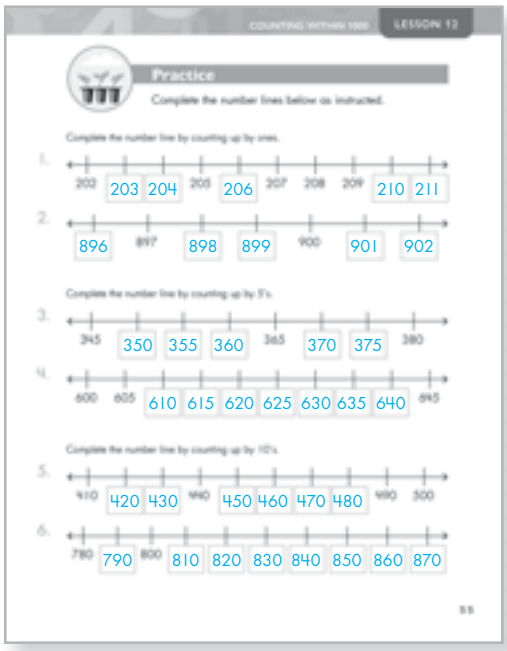
LESSON 12

The number line practice in this lesson helps students gain mo e familiarity with them. The mai concept they need to grasp is that the number line increases by the same amount each time.

Page 54 Answers



Page 55 Answers



LESSON 13

The beauty of base ten blocks is that they help kids visualize how ten tens make one hundred or how ten hundreds makes one thousand. This image makes an abstract concept much more concrete.

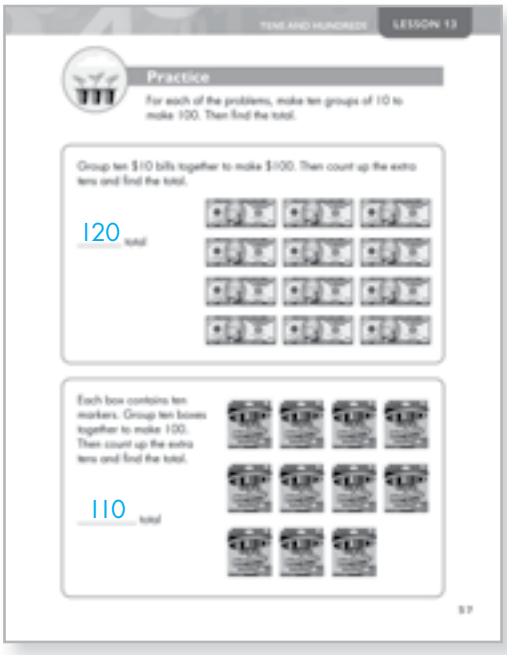
Take it Further: If you have Monopoly money or play money, use the $10 bills to practice counting by tens to diffe ent amounts.

Once students have firmly grasped counting by tens on their own, you may want to show students a shortcut in counting the tens. If they remove the last zero from the total, they will find the number of tens. They could also use this to check their answer.

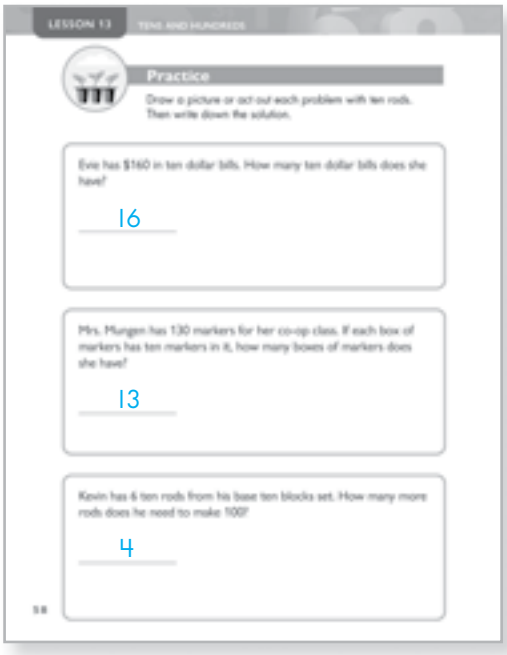
160 = 16 tens

Page 56 Answers

Page 57 Answers



Page 58 Answers

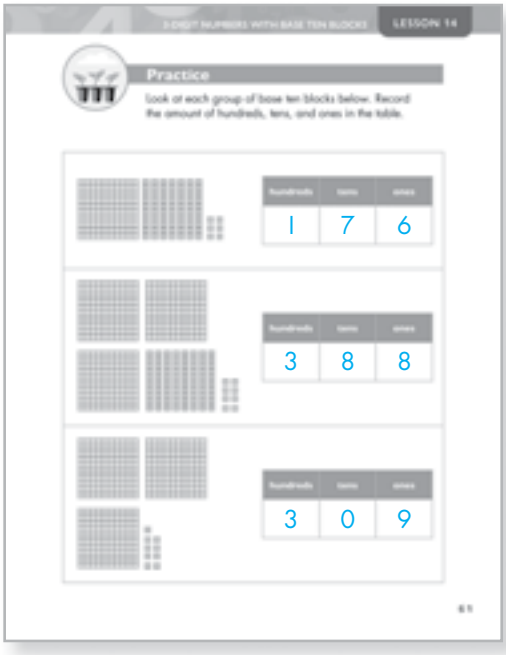


LESSON 14

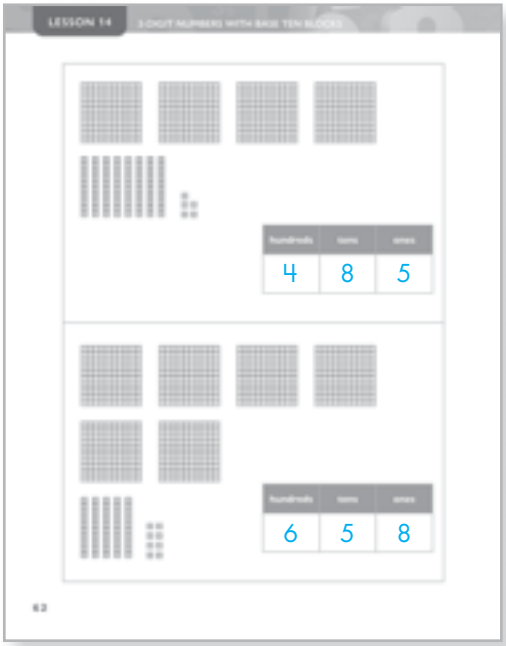
For the opening activity, you want to start out with 110, 120, 130, 140, 150, 160, 170, 180, or 190 beans. You can have your child help you make the groups of 10 so that it doesn't take as long. You can even place each group of 10 beans in a small cup or bowl to keep them organized. Then ou can easily remove or add groups of 10 so that your child can practice counting up to another amount.

Some students will need more help than others keeping the diffe ent place values straight. If they struggle when it isn't written above each digit, try having them draw a small picture of a flat ab ve the hundreds place, a rod above the tens place, and a unit cube above the ones. That can help them build each number with base ten blocks.

Page 61 Answers



Page 62 Answers



Page 63 Answers

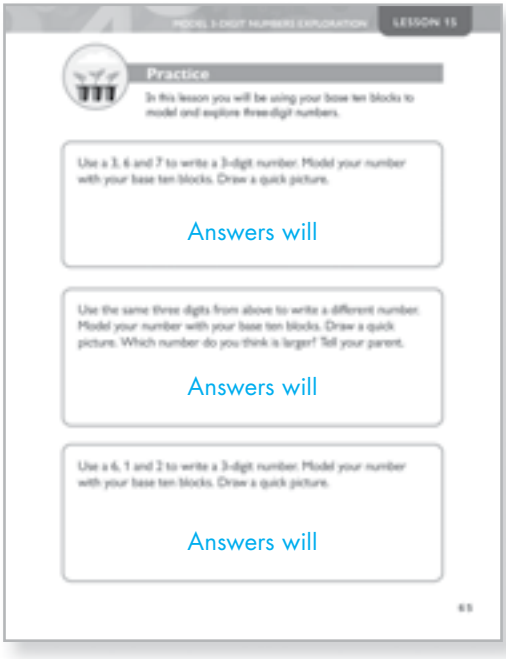
LESSON 15

Play is important in mathematics. If kids are having a lot of fun trying out diffe ent towers, let them. Just be sure to have them write down the totals. They only need to ecord their best tower in the book. The number of blocks is limited so that students wo 't have to regroup when they find the total

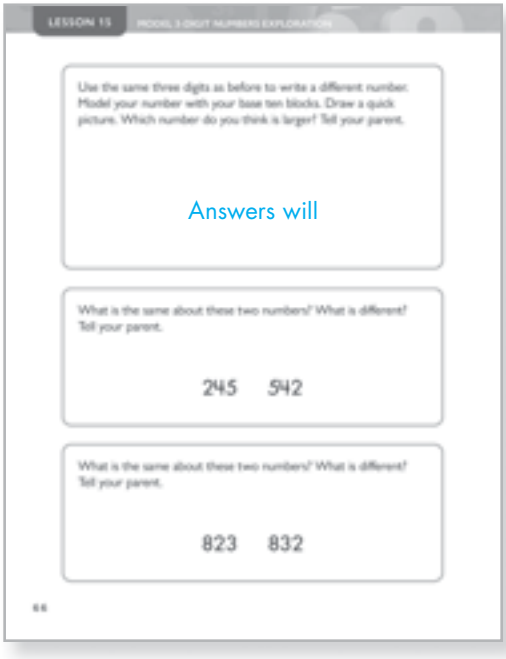
Most students will use 7 flats, 4 ods, and 2 cubes in the 742 challenge. However, it is completely legal to use another combination (7 flats, 3 ods, and 12 cubes for instance). If you have a second set of base ten blocks, students might choose to change out a flat for 10 more rods. Also, measurement hasn't been taught yet in this book, but I couldn't resist. It fits so naturally he e and allows kids to compare the heights of their towers more easily with others. It is fine if ou measure the tower for them. They a e still being exposed to the concept by watching you.

Sketches of the base ten blocks can be very simple: a square for a flat, a line for a od, and a dot for the unit cube. It is just to provide a record of their work that they can refer to later.

Page 65 Answers



Page 66 Answers



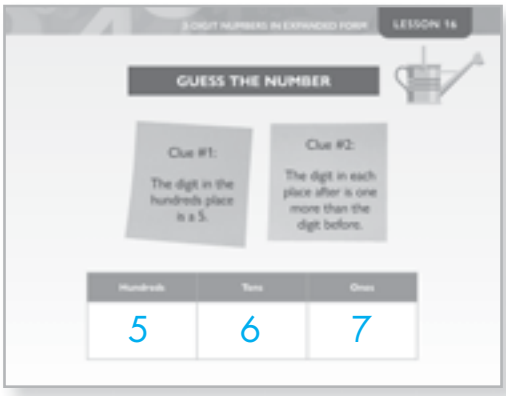
They both have 4 tens. But their hundreds and ones digits are different.

They both have 8 hundreds. But their tens and ones digits are different.

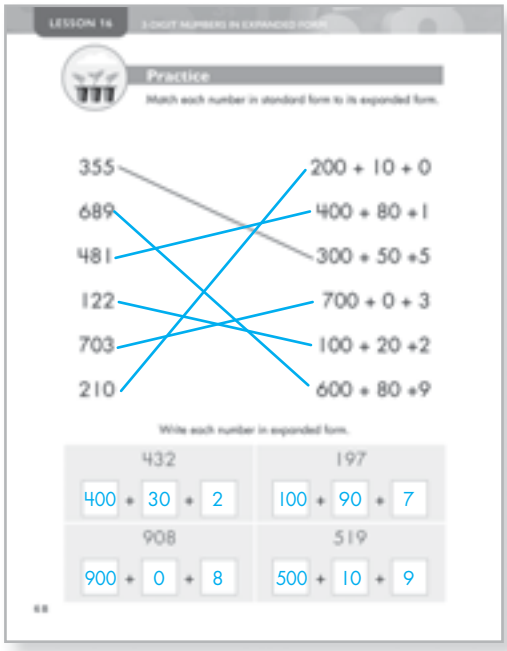
LESSON 16

Expanded form is so important, especially now that we are learning about three-digit numbers. It forces students to really understand what each digit in the number represents. It also lays the groundwork for adding three-digit numbers.

Page 67 Answers



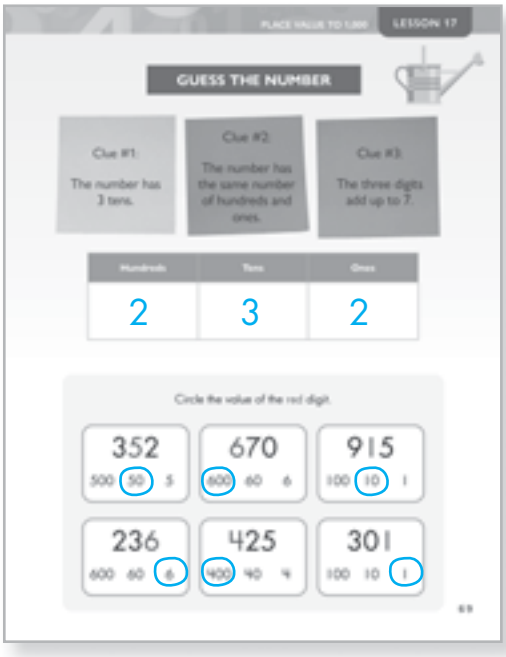
Page 68 Answers



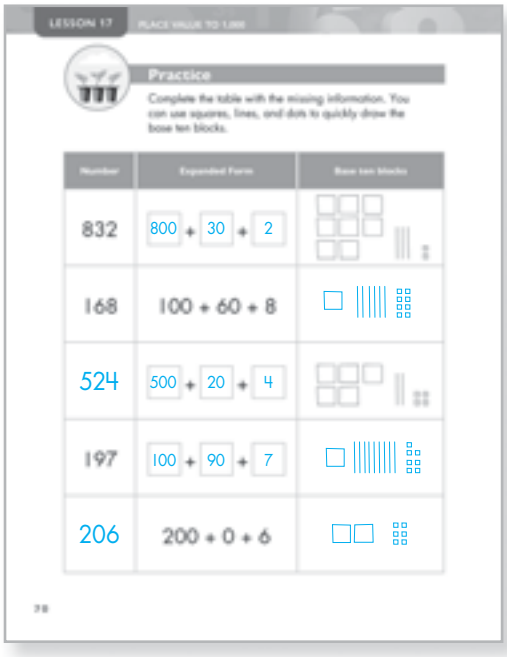
LESSON 17

Sketches of the base ten blocks can be very simple: a square for a flat, a line for a rod, and a dot for the unit cube. It is included so students can continue to see the relationships between the different forms. Learning to represent the same concept (or number) in different ways strengthens their understanding.

Page 69 Answers

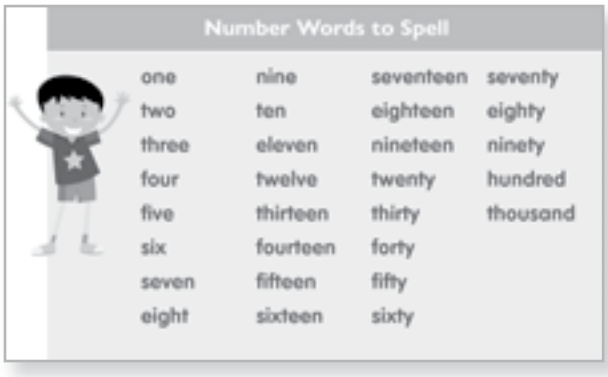


Page 70 Answers

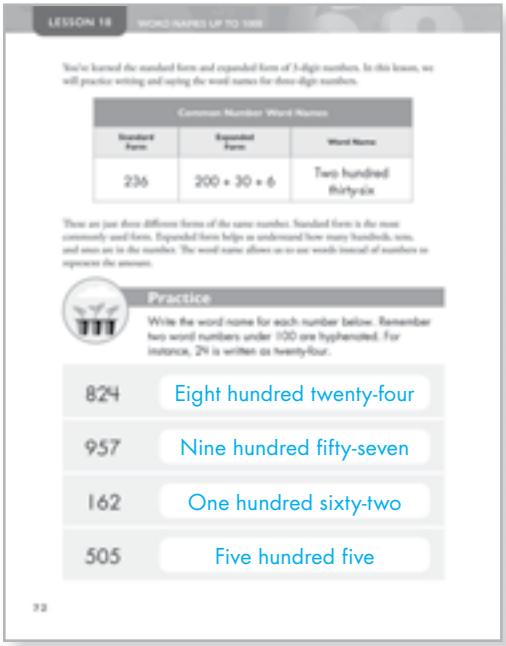


LESSON 18

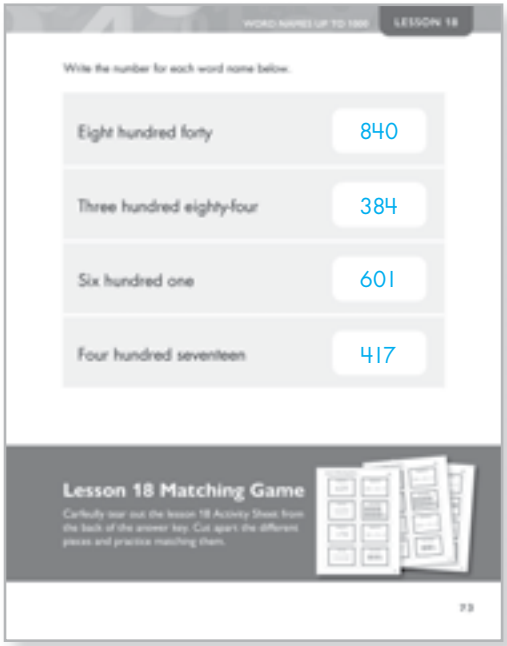
Number words are tricky to spell. Feel free to let your child flip back to the chart to check the spelling of certain words. There is also a printable of this chart available on the Book Extras website.



Page 72 Answers



Page 73 Answers



LESSON 18: MATCHING GAME ANSWERS

LESSON 19

This whole lesson is the game whe e students roll 3 dice and represent their three-digit number in 3 diffe ent ways. It provides some fun and a break from the regular problems. But it also is building a deep understanding of three-digit numbers into your student. Every time they represent a number in a diffe ent way it adds a layer of meaning to their understanding.

The ans ers will vary with each roll so it is important that you sit with your child as they play this game. This is the only assignment for the da , so take some time and have fun.

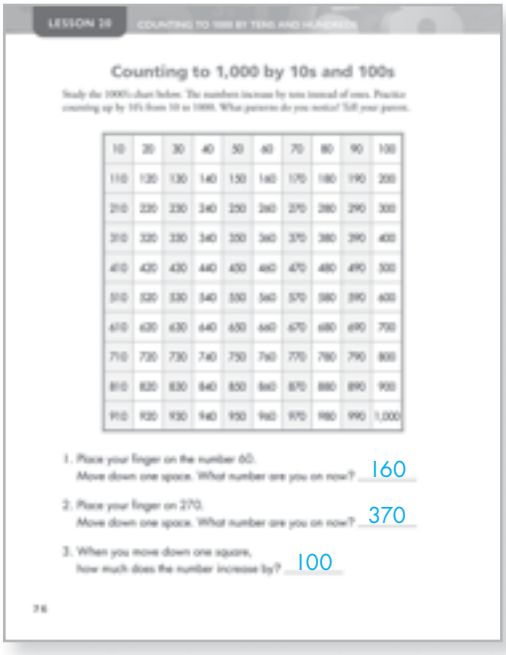
LESSON 20

The e is no opening activity for this lesson.

Counting to 1000 is daunting! But we do want kids to get a sense of how the numbers progress. The cha t that increases by tens is a way to do that without overwhelming them.

Take it Further: If you do have an eager student who wants to try counting all the way to 1000, let them try. If they make it you can tell them the author of this book said "very impressive!" If you want, send a photo of your child, his or her first name, and our consent for Apologia to post your child's photo on its sites to customerservice@apologia.com and we'll post it on our Facebook page under "Look Who Can Count to 1000!"

Page 76 Answers



LESSON 20 COUNTING TO 1000 BY TENS AND HUNDREDS

Counting to 1,000 by 10s and 100s

Study the 1000's chart below. The numbers increase by ten instead of one. Practice counting up by 10's from 10 to 1000. What patterns do you notice? Tell your parent.

10	20	30	40	50	60	70	80	90	100
110	120	130	140	150	160	170	180	190	200
210	220	230	240	250	260	270	280	290	300
310	320	330	340	350	360	370	380	390	400
410	420	430	440	450	460	470	480	490	500
510	520	530	540	550	560	570	580	590	600
610	620	630	640	650	660	670	680	690	700
710	720	730	740	750	760	770	780	790	800
810	820	830	840	850	860	870	880	890	900
910	920	930	940	950	960	970	980	990	1,000

1. Place your finger on the number 60. Move down one space. What number are you on now? 160

2. Place your finger on 270. Move down one space. What number are you on now? 370

3. When you move down one square, how much does the number increase by? 100

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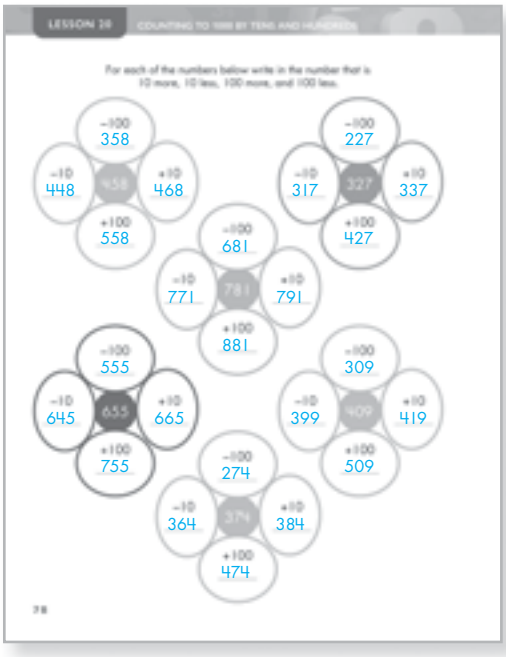
Page 77 Answers

Page 78 Answers



LESSON 21

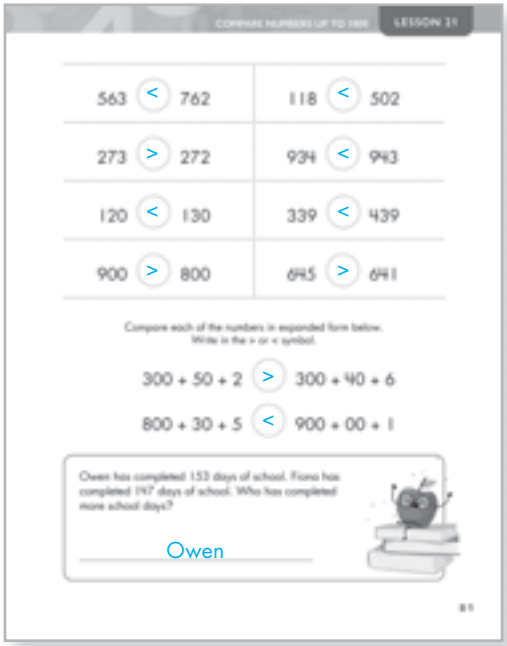
Students won't have enough base ten blocks to build some of the larger numbers. In that case, they can sketch a picture of the blocks they would use. This still helps them to visuali e the place value of the digits.

If they are struggling with writing the correct sign, have them circle the bigger number first. Then ou can tell if they are getting the problem wrong because they aren't correctly comparing the numbers or if they are just getting confused about the direction of the inequality sign.

Page 79 Answers

Page 80 Answers

Page 81 Answers



LESSON 22

The Yahtzee game takes the place of the unit project because I found it was the best way for them to apply all the diffe ent things they learned in the first two chapters.

If you have a small box lid (like the top part of a board game box), you can roll the dice inside. Since you will be rolling the dice so many times, it really helps to contain the dice and avoid the frustration of dice going all over the place.

Unit two will take your child from reviewing facts all the way to subtracting with regrouping. Base ten blocks are the main manipulative in this unit because they are the easiest way to show the regrouping in a tangible way. But you will see other methods introduced too that enrich the ideas. One of my favorites is expanded form because it clearly shows the kids what each digit represents. After this unit, they work on money and time in unit three. That was intentional; I wanted them to have a break from all the addition and subtraction so they come back to it fresh in unit four to learn about three-digit numbers.

COMPLETE SUPPLY LIST

- Base ten blocks
- Linking cubes
- 3D shape solids
- Pattern blocks
- Addition flashcards (up to 20)
- Subtraction flashcards (up to 20)
- LEGO® bricks
- Dominoes
- Dice
- A timer
- Colored pencils
- Tape or glue
- Scissors
- Small objects (such as pennies, beans, etc.)
- Ruler with inches and centimeters
- A paper clip
- Masking tape
- Numbered cards such as Uno® cards
- Notecards
- Oreo® cookies
- M&M's®
- Two Styrofoam® cups
- Five slips of paper or Post-it Notes®
- One manila folder
- Two large sheets of chart paper or poster board
- Markers
- Coins
- Two brown paper bags
- A dollar bill (real or fake)
- Three paper plates
- A brass fastener
- Flyers and magazines
- A stapler
- Inch squares
- Playdough®
- Construction paper
- Googly eyes, feathers, glitter, etc. (optional)
- A tape measure
- Yarn or twine
- A plate
- Dot stickers
- A balloon
- An empty plastic bottle
- 1 cup white vinegar
- 3 tsp. baking soda
- A funnel
- Bean seeds
- Potting mix
- Four small pots or cups
- A tray
- Pretzels and small marshmallows
- Pizza dough
- Cornmeal
- Pizza sauce
- Shredded mozzarella cheese
- Assorted pizza toppings
- A rolling pin
- Baking sheets