

Lesson Objectives**Content Objectives**

- Identify ones, tens, and hundreds in a three-digit number.
- Interpret models to determine the combinations of hundreds, tens, and ones in a number.
- Write a three-digit number in terms of varied combinations of hundreds, tens, and ones.

Language Objectives

- Tell how many hundreds, tens, and ones are in a given three-digit number.
- Tell how many tens are in 100 and in 200.

Standards for Mathematical Practice (SMP)

- 2** Reason abstractly and quantitatively.
- 3** Construct viable arguments and critique the reasoning of others.
- 7** Look for and make use of structure.

Prerequisite Skills

- Count to 100.
- Count by 10s and by 100s.
- Understand the concept of place value in two-digit numbers.

Lesson Vocabulary

There is no new vocabulary.

Learning Progression

In Grade 1 students are introduced to the concept of place value as it applies to two-digit numbers. is has been reinforced in Grade 2 as students add and subtract two-digit numbers.

In this lesson students use base-ten blocks to understand that one hundred can be seen as 100 ones or 10 groups of ten. As students count groups of blocks, they record the number in a chart to aid in connecting the concept that a digit is used to indicate the number of groups of objects within a number. This leads to the realization that a digit's value is dependent upon its placement in a number. The 4 in 420

represents 4 groups of one hundred, while the 4 in 42 represents 4 groups of ten. This concept will be further developed in the next lesson as students learn to accurately read and write three-digit numbers.

As early as kindergarten, students are led to recognize the inclusive nature of numbers. Within 7 there is a group of 3 and a group of 4, or 2 groups of three and 1 more, etc. This concept is extended into Grade 1 with two-digit numbers and in Grade 2 with three-digit numbers. This understanding is foundational for upcoming work with subtraction and other operations in the future.

Lesson Pacing Guide

Whole Class Instruction

Day 1 45–60 minutes	Toolbox: Interactive Tutorial* Place Value to 1,000 Introduction • Opening Activity 15 min • Think It Through Question 5 min • Think 5 min • Think 10 min • Reflect 5 min	Practice and Problem Solving Assign pages 103–104.
Day 2 45–60 minutes	Guided Instruction Think About Hundreds, Tens, and Ones • Let’s Explore the Idea 15 min • Let’s Talk About It 20 min • Try It Another Way 10 min	Practice and Problem Solving Assign pages 105–106.
Day 3 45–60 minutes	Guided Practice Connect Ideas About Place Value in Three-Digit Numbers • Evaluate 15 min • Analyze 15 min • Identify 15 min	Practice and Problem Solving Assign pages 107–108.
Day 4 45–60 minutes	Independent Practice Apply Ideas About Place Value in Three-Digit Numbers • Put It Together 30 min • Pair/Share 15 min	
Day 5 45–60 minutes	• On-Level, Intervention, or Challenge Activity 20 min Toolbox: Lesson Quiz Lesson 10 Quiz	

Small Group Differentiation

Teacher-Toolbox.com

Reteach
Ready Prerequisite Lessons 45–90 min

- Grade 1**
- Lesson 17 *Understand Tens*
 - Lesson 21 *Understand Tens and Ones*

Teacher-led Activities
Tools for Instruction 15–20 min

- Grade 1** (*Lessons 17 and 21*)
- Patterns on the Hundred Chart
- Grade 2** (*Lesson 10*)
- Model Three-Digit Numbers

Student-led Activities
Math Center Activities 30–40 min

- Grade 2** (*Lesson 10*)
- 2.14 Skip Count by 10s and 100s
 - 2.11 Three-Digit Number Vocabulary
 - 2.12 Understand Three-Digit Numbers

Personalized Learning

i-Ready.com

Independent
i-Ready Lessons* 10–20 min

- Grade 1** (*Lessons 17 and 21*)
- Grouping into Tens and Ones

*We continually update the Interactive Tutorials. Check the Teacher Toolbox for the most up-to-date offerings for this lesson.

Lesson 10

Understand Three-Digit Numbers

Opening Activity

Tens and Hundreds

Objective Explore three-digit numbers.

Time 20–30 minutes

Materials for each student

- connecting cubes

Overview

Students explore hundreds as 10 groups of ten by connecting cubes into groups of ten and bundling into groups of hundreds.

Step By Step

1 Build stacks of cubes.

- Organize students into pairs and provide them with connecting cubes.
- Ask students to build 4 stacks of 10 cubes each.
- Ask: *How many cubes did you stack?* [40] *How do you know?* [I counted them all; I counted by tens.]
- Tell students to combine their stacks with a partner. Ask: *How many cubes do you have now?* [8 stacks or 80 cubes]

2 Build hundreds.

- Ask partners to discuss how many more stacks they will need to have 100 cubes. Then have them make the extra stacks.
- Ask: *How many extra stacks did you make?* [2] *How many total stacks do you have?* [10] *How can you be sure you have 100 cubes stacked?* [count by tens]
- Ask: *How many stacks would you need to show 200 cubes?* [20] Have partners discuss this question and explain how they know.
- Share students' ideas as a class. You may want them to think about and suggest how many stacks would be needed to show 300, 400, 500, . . . cubes.

3 Apply the concept to multiples of ten.

- Have student pairs build 3 more stacks of 10 and combine them with the 10 stacks they made earlier. Ask partners to identify the total number of cubes they have both in terms of ones and tens, and in terms of hundreds and tens.

4 Extend the concept.

- Engage students in thinking about how they would show other multiples of 10 cubes. You may want to challenge them to think beyond the 100s using numbers such as 240, 350, etc.

Teacher Notes

Introduction

At A Glance

Students explore the meaning of one hundred through different models. They see that 100 can be expressed as 100 ones or 10 tens.

Step By Step

- Introduce the question at the top of the page. Emphasize that there are many ways to count to 100. Have students generate ideas of how they could count to 100. [by 1s, 2s, 5s, 10s, and so on]
- Draw students’ attention to the number 100 shown on the chart. Ask students to share what they know about the number 100. [Students may respond that it is a “big” number, that it is “worth more” than 99, and so on.]

Mathematical Discourse 1

- Read the **Think** section together. After students circle groups of 10 ones, compare what they did to the model of the 10 tens. Students should notice that they circled ten groups of 10 and the model shows ten groups of 10.
- Refer students back to the hundreds chart on the page. Ask if they can find groups of 10 in the chart. Students may identify groups either horizontally or vertically. Although both are accurate, you may want to point out that the horizontal groups include the counting numbers within each ten.

Mathematical Discourse 2

SMP TIP Look for Structure

Analyzing a hundreds chart for skip counting and identifying groups of ten helps students recognize the patterns and structure inherent in our number system, enabling them to become proficient with the base-ten number system. (SMP 7)

Understand Three-Digit Numbers

Think It Through

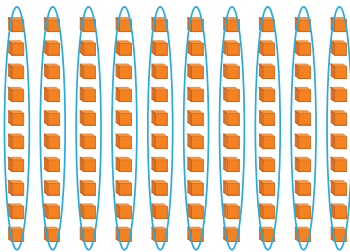
What is one hundred?



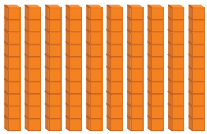
You can count to one hundred. After 99 is 100.

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

Think One hundred is 100 ones. One hundred is 10 tens.



100 = 100 ones



100 = 10 tens

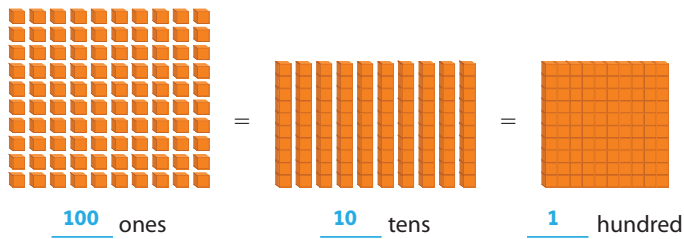
Circle groups of 10 ones in 100.

Mathematical Discourse

- 1 Look at the hundreds chart. How is the number 100 different from the other numbers in its column?
Answers will vary. Help students recognize that it has two zeros instead of only one.
- 2 How does counting by tens help you think about 100?
Instead of counting all the ones, I can count groups of ten to get to 100 much more quickly. I only have to count by tens 10 times, but it is equal to 100 ones.

Think One hundred can be shown as hundreds, tens, or ones.

 Fill in the blanks.



Ways to Show 100			
Hundreds	Tens	Ones	
0	0	100	0 hundreds + 0 tens + 100 ones
0	10	0	0 hundreds + 10 tens + 0 ones
1	0	0	1 hundred + 0 tens + 0 ones

A three-digit number has a hundreds place. It tells how many hundreds there are in a number.



► **Reflect** Work with a partner.

1 Talk About It Think about 200. How many hundreds does 200 have? How many tens? How many ones?

Write About It The number 200 has 2 hundreds, or 20 tens, or

200 ones.

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Step By Step

- Read aloud the **Think** statement about one hundred at the top of the page. Then draw students' attention to the three picture models and ask what each one represents. Instruct students to fill in the blank under each model.

► Mathematical Discourse 3 and 4

- Instruct students to look at the chart and talk to a partner to decide which of the pictures matches each row on the chart. As they share ideas, make sure they understand that the hundreds block is locked together; it has no separate tens and ones. Similarly, each tens block has no separate ones.
- Read the sentence underneath the chart. Direct students' attention to the bottom row of the chart and discuss it. Use Mathematical Discourse question 5 to emphasize what the zeros in 100 represent.

► Mathematical Discourse 5

► Hands-On Activity

- Have students reply to the *Talk About It* question. Allow students to draw pictures, if necessary, but encourage them to use number representations also.

 **Ready Mathematics**
PRACTICE AND PROBLEM SOLVING

Assign *Practice and Problem Solving* pages 103–104 after students have completed this section.

► Hands-On Activity

Use base-ten blocks to understand one hundred.

Materials: base-ten blocks

- Distribute the blocks so that each student has at least 30 ones blocks, 10 tens blocks, and 1 hundreds block.
- Instruct students to use their blocks to show 3 groups of 10. Ask students to show how many ones are in 3 groups of 10. Ask them to show 6 groups of 10. Ask: *How many ones do you think there are in 6 groups of 10?* [60] Make sure students justify their answers.
- Have students show a hundreds block. Ask how many ones they would have if they could break apart the block. [100] Then have them use tens blocks to show how many tens are in a hundreds block. [10]

► Mathematical Discourse

3 How are the three pictures on this page alike?

They all show 100.

4 How are the pictures on this page different from each other?

In the first one, all the pieces are separate. In the second one, the pieces are locked together in groups of ten, but there are spaces between each group. In the third one, all the pieces are locked together.

5 Why do you think there are two zeros after the 1 in 100?

Students should recognize that the zeros indicate that there are no tens or ones.

Guided Instruction

At A Glance

Students use counting strategies to understand three-digit numbers. Then students interpret models and organize three-digit numbers in varied ways.

Step By Step

Let's Explore the Idea

- Tell students that they will have time to work individually on the problems on this page and then share their responses in pairs. Ask students to look at the first set of models and count the groups of 100. Ask: *How many groups of 100 are shown?* [3] Instruct students to write that number on the blank. Encourage students to continue counting by hundreds to 900. Use Mathematical Discourse question 1 to connect counting strategies.

► Mathematical Discourse 1

- For Problem 3, reinforce the concept that the zeros following the 3 indicate that there are no separate tens or ones. You may want to write the following addition problem on the board: $100 + 100 + 100 = 300$. Explain that they are putting groups together just as they do when adding.
- Have students look at the second group of models and ask how these compare to the first group. They should note that in this case, there are groups of ten that are not connected.
- As students complete this page individually, circulate among them. This is an opportunity to assess student understanding and address student misconceptions.

► Mathematical Discourse 2

- Take note of students who are still having difficulty and wait to see if their understanding progresses as they work in pairs during the next part of the lesson.

SMP TIP Reason Abstractly and Quantitatively

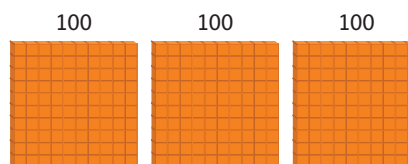
Using counting strategies to interpret three-digit numbers builds a sense of quantities in students and enables them to use symbolic representations in a meaningful way. (SMP 2)

Think About Hundreds, Tens, and Ones

Let's Explore the Idea You can count three-digit numbers by hundreds, tens, and ones.



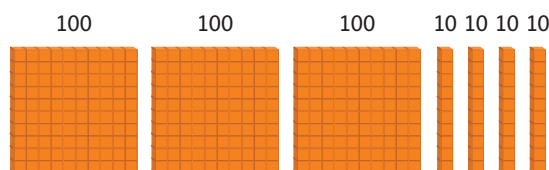
You can count hundreds.



2 Count: 1 hundred, 2 hundreds, 3 hundreds

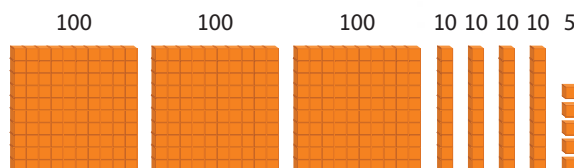
3 3 hundreds = 300

You can count hundreds and tens.



4 3 hundreds + 4 tens = $300 + 40 = 340$

You can count hundreds, tens, and ones.



5 3 hundreds + 4 tens + 5 ones = $300 + 40 + 5 = 345$

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► Mathematical Discourse

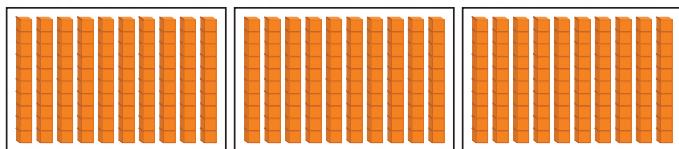
- How is counting by hundreds like counting by tens?*
You count 1 group of one hundred, 2 groups of one hundred, 3 groups of one hundred, and so on, just like you count 1 group of ten, 2 groups of ten, 3 groups of ten, and so on.
- Why doesn't it make sense to write 300 instead of 3 on the first blank, or 40 instead of 4 on the second blank?*
There aren't 300 groups of one hundred, but 3 groups of 100; and there aren't 40 groups of ten, but 4 groups of ten.

Let's Talk About It

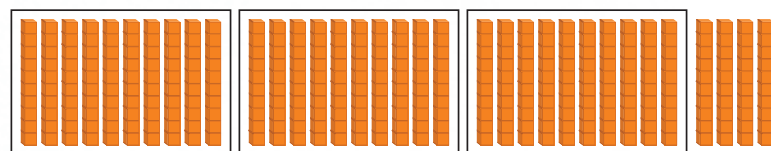
Work with a partner.



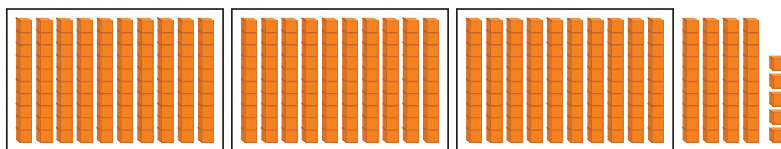
6 This model shows 300 in tens. $300 = 30$ tens



7 This model shows 340 in tens. $340 = 34$ tens



8 This model shows 345 in tens. There are ones left over.
 $345 = 34$ tens and 5 ones



Try It Another Way Write hundreds, tens, and ones in a chart.

Example

3 hundreds + 5 tens + 8 ones

Hundreds	Tens	Ones
3	5	8

9 5 hundreds + 3 tens

Hundreds	Tens	Ones
5	3	0

10 7 hundreds + 8 ones

Hundreds	Tens	Ones
7	0	8

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Step By Step

Let's Talk About It

- Organize students in pairs to answer Problems 6–8 on this page. You may choose to work through Problem 6 together.
- Walk around to each pair. Listen to and join in on discussions at different points. Use Mathematical Discourse questions 3 and 4 to help support or extend students' thinking.

Mathematical Discourse 3 and 4

Try It Another Way

- Direct students' attention to **Try It Another Way**. Instruct them to continue to work in pairs to fill in the charts.
- Invite volunteers to come to the board to show how they completed the charts for Problems 9 and 10.
- Make sure students include a zero as a placeholder in each of the problems. Discuss that in the chart, it may not seem important to include the zero, but when the number is written out of the chart, it is very important.
- Write 260 on the board and ask students to read the number. Then write the number 26 on the board and ask them to read it. Ask: *Why is it important to add the zero on the end of 260?* [It makes the 26 mean 26 tens, not 26 ones.]

Visual Model

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PRACTICE AND PROBLEM SOLVING

Assign *Practice and Problem Solving* pages 105–106 after students have completed this section.

Visual Model

Draw models to show the importance of placeholders.

- Tell students that you will draw some simple models to help them understand placeholders. Draw the following on the board:



- Write 100 inside each square and 10 under each rectangle. Then write $3 \text{ hundreds} + 5 \text{ tens} = 350$.
- Draw the following:



- Ask students to write the number shown by the model. [35] Compare the models to show that they are not equal.

Mathematical Discourse

3 Why do you think there is a box around some of the tens? What does it represent?

Students should recognize that there are 10 tens in each box, which represents 100. The boxes make it easier to count the groups.

4 How do the models help you think about the number 345?

It is easy to see the 10 tens in each hundred, and the extra tens and ones. In 345, there are 3 hundreds, 4 tens, and 5 ones, which is equal to 34 tens and 5 ones. Or 345 could be broken apart into 345 ones.

Guided Practice

At A Glance

Students demonstrate their understanding of three-digit numbers by analyzing different ways to represent them. Then students represent quantities in different ways.

Step By Step

- Discuss each problem as a class using the discussion points outlined below.
- Evaluate**
 - Ask students to explain the error Lana made. [She didn't write a zero in the tens place to show there are no separate tens.]
 - Then ask: *How would you help Lana understand what she did wrong?* Encourage volunteers to share their ideas with the class.

Analyze

- Write the way each student represented the number 572 on separate sections of the board. Ask students to talk to a partner about what each student did.
- Encourage volunteers to come to the board to draw models showing what Sam and Lev did. You may want to ask students to draw $\square$ for 100, $|$ for 10, and $\bullet$ for one. Make sure that for the 57 tens, groups of 10 tens are boxed to represent a group of 100. This will make the models more visually similar.

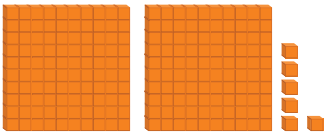
Identify

- Draw the completed chart from the student page on the board. Add several blank rows to the bottom of the chart.
- Ask: *Can you think of another way to show 256?* If there are no viable responses, make suggestions such as: *How would you complete the rest of the row if there were 20 tens? Or: What if I put 126 in the ones column?*
- Write those numbers in additional rows at the bottom of the chart and allow students to determine how they might complete each row.

Connect Ideas About Place Value in Three-Digit Numbers

Talk about these questions as a class. Then write your answers.

- 11 Evaluate** Lana did this homework problem. What did she do wrong?



$2 \text{ hundreds} + 6 \text{ ones} = 26$

Possible answer: Lana didn't put a 0 in the tens place. So she wrote the 2 hundreds as 2 tens.

- 12 Analyze** Look at how Sam and Lev wrote 572. Explain what each person did.

Sam $572 = 57 \text{ tens} + 2 \text{ ones}$
Lev $572 = 5 \text{ hundreds} + 7 \text{ tens} + 2 \text{ ones}$

Sam used only tens and ones to write the number. 57 tens is 570.
 $570 + 2 = 572$. Lev used hundreds, tens, and ones. $500 + 70 + 2 = 572$.

- 13 Identify** Fill in the blanks to show 256 in different ways.

Hundreds	Tens	Ones
0	0	256
0	25	6
2	5	6

Scoring Rubrics

Part A

Points	Expectations
2	The student draws an accurate model to represent the situation.
1	The student is partially correct. Some elements of the model may be accurate but not all of them.
0	The student is not able to accurately complete the model.

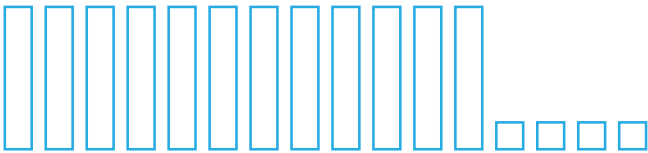
Apply Ideas About Place Value in Three-Digit Numbers

Put It Together Use what you have learned to complete this task.

14 Nate puts his coins in stacks of ten. He has 12 stacks of coins with 4 coins left over.

Part A Draw a picture to show Nate’s coins.

Possible drawing:



Part B How many coins does Nate have? Write the answer in two different ways.

Possible answer: 12 tens + 4 ones; $120 + 4$, or 124 coins

Part C Nate gets 30 more coins from a friend. Nate says that he now has 190 coins. Do you agree or disagree? Explain.

Possible answer: I disagree. Nate had 124 coins and got 30 more.

$124 + 30 = 154$, not 190. So Nate now has 154 coins.

Independent Practice

Step By Step

Put It Together

- Direct students to complete the **Put It Together** task on their own.
- Have counters or tiles available for students to stack, if necessary, to make sense of the problem.
- Suggest that students draw rectangles or simple cylinders to represent the stack of coins. It is not necessary to show the ten coins in each stack; however, some students may need to do this. Encourage students to focus on the task rather than on making an artistic drawing.
- For Part C, students may use a drawing or equation to solve. Remind them to explain why they agree or disagree.
- As students work on their own, walk around to assess their progress and understanding, to answer their questions, and to give additional support, if needed.
- If time permits, have students share the strategies they used in completing the task.

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Assign *Practice and Problem Solving* pages 107–108 after students have completed Guided Practice.

Part B

Points	Expectations
2	The student answers correctly and writes the number in two different ways.
1	The answer is correct, but only one written representation is accurate.
0	The student is not able to accurately answer or write the number in two ways.

Part C

Points	Expectations
2	The student disagrees with Nate and justifies this response by using an accurate model, correct equation, or logical reasoning.
1	The student disagrees with Nate but does not fully justify this response with an accurate model, correct equation, or logical reasoning.
0	The student agrees that Nate now has 190 coins or disagrees and does not provide a logical reason.

Differentiated Instruction

► Intervention Activity

Break apart numbers.

Materials: base-ten blocks, Place-Value Mat (Activity Sheet 6), Three-Digit Cards (Activity Sheet 7), and a blank card

- Provide each student with base-ten blocks, a blank card, and a place-value mat. Place the three-digit number cards facedown. Each student draws a card.
- Have students use the blank card to cover the tens place and ones place on the three-digit number card. Then students place hundreds blocks on the mat to represent the hundreds digit in the number. Slide the blank card to show the number of tens blocks to place on the mat. Finally, slide the blank card again and place the number of ones shown. You may want to repeat this activity several times.

► On-Level Activity

Play three-digit number “around the table.”

Materials: For each student: base-ten blocks and Place-Value Mat (Activity Sheet 6); For each group: Three-Digit Cards (Activity Sheet 7)

- Place students in groups of 3. Provide each student with a place-value mat and base-ten blocks. Place the cards facedown in a pile. Allow one student to pick a card and use blocks to represent the number on the mat. The student to the right must represent the same number in a different way, and then the last student must represent the number in another way.
- The only rule is that no one can use *all* ones to represent the number. Once students have agreed that all the representations are accurate, they record each representation. The second student in the group picks a card and play resumes as in the first round. Continue until time is up or the cards have all been used.

► Challenge Activity

Find all the ways to show a three-digit number.

Materials: paper and pencil

- Refer back to the **Identify** activity students did as a class during Guided Practice. Help students draw a similar chart, or have one drawn for each of them. Ask them to label the columns Hundreds, Tens, and Ones. (You will need to have extra paper or extra charts available.)
- Tell students you want them to try to find *all* the ways to show 127 on the chart. Encourage them to think of possible strategies they may use before beginning. Allow students to discuss those strategies with each other or with you.
- After students have completed the task, evaluate their charts to determine if they have included all the ways to show 127. Then have them present their charts to the class. Ask them to discuss the patterns they used and then display the charts on the wall or bulletin board.

Teacher Notes

Overview

Assign the Lesson 10 Quiz and have students work independently to complete it.

Use the results of the quiz to assess students' understanding of the content of the lesson and to identify areas for reteaching. See the Lesson Pacing Guide at the beginning of the lesson and the Differentiated Instruction activities that follow for suggested instructional resources.

Tested Skills

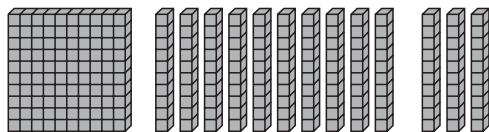
Problems on this assessment form require students to be able to skip count by 10 and 100; represent a base-ten model with a standard form number, expanded form number, or number name; and write a three-digit number as varied combinations of hundreds, tens, and ones.

Ready® Mathematics

Lesson 10 Quiz

Solve the problems.

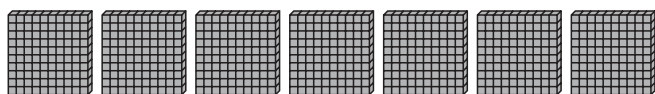
- 1 Hannah is working with blocks to show numbers. What does this set of blocks show?



Circle all the correct answers.

- A 20 hundreds + 3 tens + 0 ones
- B 0 hundreds + 23 tens + 0 ones
- C 2 hundreds + 3 tens + 0 ones
- D 1 hundred + 13 tens + 0 ones
- E 1 hundred + 10 tens + 3 ones
- F 0 hundreds + 0 tens + 230 ones

- 2 Diego makes a model to show the value of a number. What is this same value in tens and in ones?



Fill in the blanks to answer.

The model shows _____ hundreds. This is the same value as _____ tens or _____ ones.

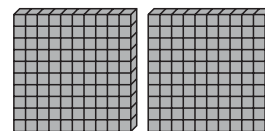
Lesson 10 Quiz continued

- 3 A sticker book has 100 stickers. A sticker paper has 10 stickers. Ellen and Nick have 5 sticker books and 4 sticker papers. Ellen says they have 450 stickers. Nick says they have 504 stickers. Who is right and why?

Circle the correct answer.

- A Ellen is right. When you count by 100 four times and then count by 10 five times, you get 450 stickers.
- B Nick is right. When you count by 100 five times and then add 4, you get 504 stickers.
- C Neither is right. When you count by 100 five times and then add 4, you get 54 stickers.
- D Neither is right. When you count by 100 five times and then count by 10 four times, you get 540 stickers.

- 4 What value does the model show?



Circle Yes or No to tell if the model shows the value.

- | | | |
|---------------|-----|----|
| a. 2 ones | Yes | No |
| b. 200 | Yes | No |
| c. 20 | Yes | No |
| d. 2 hundreds | Yes | No |

Common Misconceptions and Errors

Errors may result if students:

- skip count by 10 or 100 incorrectly or by an incorrect value.
- count a number of objects incorrectly.
- confuse the tens and hundreds place-value positions.
- regroup ones as tens or tens as hundreds incorrectly.

Ready® Mathematics**Lesson 10 Quiz Answer Key**

1. B, C, D, F
DOK 2

2. 7, 70, 700
DOK 1

3. D
DOK 3

4. a. No
b. Yes
c. No
d. Yes
DOK 2