

Using a Session

Teacher's Guide

i-Ready Classroom Mathematics lessons consist of three types of sessions: Explore, Develop, and Refine.

The following is a walkthrough of the planning and support features within the Teacher's Guide for a Develop session. You will find many of the same features in the Explore and Refine sessions.

Lesson Overview provides information for use in planning whole class instruction, small group differentiation, and independent learning opportunities.

CCSS Focus sets learning expectations for students' conceptual understanding and how they demonstrate that understanding.

Content Objectives identify the mathematical learning goals for the lesson, while **Language Objectives** identify how students show their understanding of those goals.

Prerequisite Skills are opportunities to monitor understanding and identify students' learning needs.

Learning Progression sets context for the mathematics of the lesson, providing information on how the content fits across and within grade levels—what students previously learned, what they are learning now, and what they will be learning next.

Lesson Overview

LESSON 12 Multiply by Two-Digit Numbers

CCSS Focus

Domain

Number and Operations in Base Ten

Cluster

B. Use place value understanding and properties of operations to perform multi-digit arithmetic.

Standard

4.NBT.B.5 Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

Standards for Mathematical Practice (SMP)

SMPs 1, 2, 3, 4, 5, and 6 are integrated in every lesson through the *Try-Discuss-Connect* routine.*

In addition, this lesson particularly emphasizes the following SMPs:

- 5 Use appropriate tools strategically.
- 7 Look for and make use of structure.

*See page 1i to see how every lesson includes these SMPs.

Lesson Objectives

Content Objectives

- Multiply a two-digit number by a two-digit number.
- Use area models and partial products to multiply.
- Use estimation to determine whether an answer is reasonable.

Language Objectives

- Read aloud multiplication problems.
- Draw an area model to multiply.
- Write a solution to a multiplication problem using partial products.
- Tell how each part of an area model relates to the factors, partial products, and product of a multiplication problem.

Prerequisite Skills

- Recall basic multiplication facts.
- Know properties of operations.
- Understand place value.
- Understand and use area models.
- Multiply whole numbers of up to four digits by a one-digit whole number.

Learning Progression

In Grade 3 students developed an understanding of multiplication.

In the previous Grade 4 lesson students used arrays of base-ten blocks, area models, and partial products, as well as their understanding of place value, to multiply three- and four-digit numbers by one-digit numbers.

In this lesson students use properties of operations, area models, and partial products to multiply two-digit numbers

Lesson Vocabulary

There is no new vocabulary. Review the following key terms.

- **estimate (verb)** to give an approximate number or answer based on mathematical thinking.
- **factor** a number that is multiplied.
- **factors of a number** whole numbers that multiply together to get the given number.
- **multiple** the product of a given number and any other whole number.
- **multiplication** an operation used to find the total number of items in a given number of equal-sized groups.
- **multiply** to repeatedly add the same number a certain number of times. Used to find the total number of items in equal-sized groups.
- **partial products** the products you get in each step of the partial-products strategy. You use place value to find partial products. For example, the partial products for 124×3 are 3×100 or 300, 3×20 or 60, and 3×4 or 12.
- **product** the result of multiplication.
- **reasonable** something that makes sense when given facts are taken into account.

Lesson Pacing Guide

Whole Class Instruction

SESSION 1 Explore

45–60 min

Multiplying by Two-Digit Numbers

- Start 5 min
- Try It 10 min
- Discuss It 10 min
- Connect It 15 min
- Close & Exit Ticket 5 min

Additional Practice

Lesson pages 255–256

SESSION 2 Develop

45–60 min

Multiplying by Two-Digit Numbers

- Start 5 min
- Try It 10 min
- Discuss It 10 min
- Picture It & Model It 5 min
- Connect It 10 min
- Close & Exit Ticket 5 min

Additional Practice

Lesson pages 261–262

Fluency

Multiplying by Two-Digit Numbers

SESSION 3 Refine

45–60 min

Multiplying by Two-Digit Numbers

- Start 5 min
- Example & Problems 1–3 15 min
- Practice & Small Group Differentiation 20 min
- Close: Exit Ticket 5 min

Lesson Quiz

or Digital Comprehension Check

Lesson Materials

Lesson (Required)

Per student: copy of Start slide (Session 2)

Activities

Per pair: base-ten blocks (2 hundreds flats, 14 tens rods, 55 ones units), play money (93 \$1 bills, 62 \$10 bills, and 6 \$100 bills)

Math Toolkit

base-ten blocks, counters, cups, paper plates, grid paper

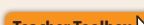
Digital Math Tool

Multiplication Models



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

Small Group Differentiation



PREPARE

Ready Prerequisite Lessons

Grade 3

- Lesson 8 Use Order and Grouping to Multiply
- Lesson 9 Use Place Value to Multiply
- Lesson 12 Multiplication and Division Facts

RETEACH

Tools for Instruction

Grade 3

- Lesson 8 Use Order and Grouping to Multiply
- Lesson 9 Use Place Value to Multiply
- Lesson 12 Write Multiplication and Division Facts

Grade 4

- Lesson 12 Multiply by Two-Digit Numbers

REINFORCE

Math Center Activity

Grade 4

- Lesson 12 Multiplying by Two-Digit Numbers

EXTEND

Enrichment Activity

Grade 4

- Lesson 12 Display of Cans

i-Ready Independent Learning

PERSONALIZE

i-Ready Lessons*

Grade 4

- Multiply Two-Digit Numbers by Two-Digit Numbers
- Practice: Multiply Two-Digit Numbers

Learning Games

- Prerequisite: Match
- Prerequisite: Cupcake
- Prerequisite: Pizza

Whole Class Instruction session-by-session pacing is used to plan daily instruction and practice.

Small Group Differentiation

resources support learning for all students with *Tools for Instruction* for targeted skills instruction, differentiated *Math Center Activities* to reinforce on-level skills, and *Enrichment Activities* that extend understanding.

Additional Practice and Fluency & Skills Practice are for use as in-class small group work, after-class work, or at-home learning.

The **Lesson Quiz or Digital Comprehension Check** assesses students' progress toward mastery of lesson content and is a way to identify where reteaching is needed.

Optional Add-On: Independent Learning resources provide students with opportunities to strengthen grade-level skills by working on their personalized path with *i-Ready Online Instruction* or to build fluency skills with interactive *Learning Games*.

Using a Session

Teacher's Guide

continued

Purpose provides a roadmap of what students will be learning and doing across the session.

Start establishes a clear and accessible entry point for each session, engaging students mathematically with prerequisite content. It frequently is an opportunity to have students manipulate concrete objects to model a mathematics skill or concept.

Develop Language provides language support for all students and is especially useful in helping EL students make sense of the problem.

Support Partner Discussion provides teachers with prompts to help students engage in meaningful peer discourse.

Make Sense of the Problem uses a language routine to help students understand the problem. See the Language Routines section on the Teacher Toolbox (under the Program Implementation tab) for suggestions on how to integrate language routines, teacher moves, and conversation tips during instruction.

LESSON 12 SESSION 2 Develop

Purpose In this session, students solve a problem that requires finding the product of 2 two-digit numbers. Students model the multiplication either on paper or with manipulatives to find the product. The purpose of this problem is to have students develop a strategy for multiplying two-digit numbers by two-digit numbers.

Start

Connect to Prior Knowledge

Materials For each student: copy of Start slide
Why Support students' facility with breaking apart numbers by place value to multiply as well as multiplying with multiples of 10.

How Have students find the product of 2 two-digit numbers by completing expressions to break apart one factor and use partial products to find the product.

Complete to find 12×32 .
 $12 \times (\dots + \dots)$
 $(12 \times \dots) + (12 \times \dots)$
 $\dots + \dots$

Possible Solution
 $12 \times (30 + 2)$
 $(12 \times 30) + (12 \times 2)$
 $360 + 24$
 384

Develop Language

Why Clarify the meaning of the term *row*.

How Explain to students that the word *row* can be a straight line of people or things that are next to one another. Remind students that they line up in a row, or straight line, one after another, when they go to the cafeteria or library. Ask students to give real-world examples of rows they may see at home or in school. Have students close their eyes and visualize rows of chairs in a school auditorium or cafeteria and then describe to partners what they see in their mental images.

TRY IT

Make Sense of the Problem

To support students in making sense of the problem, have them identify that there are 16 rows of chairs and that each row has 28 chairs in it.

Ask What are you trying to find out? What do you know?

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Lesson 12 Multiply by Two-Digit Numbers

Common Misconception

identifies misconceptions that lead to errors in understanding, which can then be addressed in whole class discussion as students are prompted to explain their reasoning.

LESSON 12 SESSION 2 Develop Multiplying by Two-Digit Numbers

Read and try to solve the problem below.

Folding chairs are set up in a school auditorium for a play. There are 16 rows of chairs. Each row has 28 chairs. How many folding chairs are set up for the play?

TRY IT

Possible student work:

Sample A	16	16	320
	$\times 20$	$\times 8$	$+ 128$
	120	48	448
	+ 200	+ 80	
	320	128	

There are 448 chairs set up for the play.



Math Toolkit
• base-ten blocks
• grid paper
• multiplication models

20	+	8
10	$10 \times 20 = 200$	$10 \times 8 = 80$
+		
6	$6 \times 20 = 120$	$6 \times 8 = 48$

$16 \times 28 = 200 + 80 + 120 + 48 = 448$

There are 448 folding chairs set up for the play.

DISCUSS IT
Ask your partner: Why did you choose that strategy?
Tell your partner: A model I used was... It helped me...

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DISCUSS IT

Support Partner Discussion

Encourage students to use the terms *partial product* and *hundreds, tens, and ones* as they discuss their solutions.

Support as needed with questions such as:

- How did you break apart the numbers 16 and 28?
- How did you find the total that represents the product?

Common Misconception Look for students who find only some, not all, of the partial products. Remind students that they must multiply the value of each digit in 16 by the value of each digit in 28.

Select and Sequence Student Solutions

One possible order for whole class discussion:

- base-ten blocks or drawings modeling 16 groups of 28
- breaking apart one factor into tens and ones and multiplying to find partial products
- area model showing partial products
- vertical multiplication of two-digit numbers showing partial products

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Select and Sequence Student Solutions

gives a range of possible strategies—from concrete to representational to abstract—for use in monitoring student work and facilitating discourse. This information can be used to make decisions about which models and strategies to share and discuss as a class.

Support Whole Class Discussion

Compare and connect the different representations and have students identify how they are related.

Ask Where does your model show the tens and ones in 16? the tens and ones in 28? multiplication of the tens and ones in each number by the tens and ones in the other? the partial products? the product?

Listen for Students should recognize that accurate responses include representations showing 16 and 28 broken apart into tens and ones, multiplying the value of each place in one number by the value of each place in the other to find partial products, and adding partial products to find the product.

PICTURE IT & MODEL IT

If no student presented these models, connect them to the student models by pointing out the ways they each represent:

- the number of tens and ones in 16 and 28
- multiplying the value of each place in 28 by the value of each place in 16
- partial products of 10×20 , 10×8 , 6×20 , and 6×8

Ask How do the models show breaking apart 16 and 28 into tens and ones? using place value to multiply? partial products?

Listen for The area model shows 16 as $10 + 6$ on the side of the model and 28 as $20 + 8$ on the top; the other model shows the ones and tens in 16 and 28 next to the partial products. Both show the 2 tens and the 8 ones in 28 multiplied by the 1 ten and the 6 ones in 16 to find four partial products that are added to find the product.

For an area model, prompt students to identify how multiplication by place value is shown.

- Where is the number of rows of chairs in the model?
- Why is the number of rows of chairs shown this way?
- Where is the number of chairs in each row?
- Why is the number of chairs shown this way?

For partial products, prompt students to identify how multiplication by place value is shown.

- How is multiplication of 28 by 16 represented?
- How are the partial products represented?
- Why do you think there are four partial products?

LESSON 12 DEVELOP

Explore different ways to understand multiplying a two-digit number by a two-digit number.

Folding chairs are set up in a school auditorium for a play. There are 16 rows of chairs. Each row has 28 chairs. How many folding chairs are set up for the play?

PICTURE IT
You can use an area model to multiply two-digit numbers.

To solve this problem, multiply 28 by 16.

20	+	8
10 $10 \times 20 = 200$		10 $10 \times 8 = 80$
+ 6 $6 \times 20 = 120$		6 $6 \times 8 = 48$
$200 + 80 + 120 + 48 = ?$		

MODEL IT
You can also multiply two-digit numbers using partial products.

28	×	16
$48 \rightarrow 6 \text{ ones} \times 8 \text{ ones}$		
$120 \rightarrow 6 \text{ ones} \times 2 \text{ tens}$		
$80 \rightarrow 1 \text{ ten} \times 8 \text{ ones}$		
$+ 200 \rightarrow 1 \text{ ten} \times 2 \text{ tens}$		
?		

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Deepen Understanding

Partial Products

SMP 7 Use structure.

When discussing the partial products model, prompt students to consider the effect of changing the order of the factors. Display the vertical multiplication problem 16×28 with the order of the factors reversed. Work together with students to solve the problem.

Ask Compare this multiplication with the multiplication shown in the Model It. What is the same about the partial products? What is different?

Listen for The partial products are the same but in a different order.

Ask Why does it make sense that the partial products are the same?

Listen for You multiply the same ones and tens digits in 16 by the same ones and tens digit in 28, so the four partial products are the same.

Generalize Do you think this is true for multiplying any two-digit number by any other two-digit number? Have students explain their reasoning. Listen for understanding that you can multiply 2 two-digit numbers in any order and the partial products will be the same.

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Lesson 12 Multiply by Two-Digit Numbers

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Ask/Listen for are mathematical discourse questions followed by expected student responses that support and facilitate whole class discussion.

As students share their thinking, the discourse questions can be used to make connections between student approaches and different models and representations, prompt justifications and critiques of approaches and solutions, and check conceptual understanding.

SMPs are infused throughout the instructional model.

Deepen Understanding is a consistent opportunity to build conceptual understanding of a key lesson concept by extending mathematical discourse. The content connects a particular aspect of lesson learning to an SMP, showing how it looks in the classroom.

Monitor and Confirm is a way to ensure that students have made sense of mathematical learning goals.

Support Whole Class Discussion provides a series of related discourse questions that illuminate the mathematical ideas of the lesson, prompting students to make connections and use that understanding to solve problems leading to abstract reasoning. These questions help students learn how to articulate a generalization of the mathematical concept.

Hands-On Activities occur consistently at strategic points in the lesson after teachers have acquired understanding of students' learning through observation and their work on questions in the Student Worktext. The activities support students who are unsure of the concept and are an opportunity for small group reteaching while other students work independently. Use of concrete objects lets students access understanding in a different way.

LESSON 12 SESSION 2 Develop

SESSION 2 • • •

CONNECT IT

- Remind students that one thing that is alike about all the representations is the numbers.
- Explain that on this page, students will use those numbers to show how both models represent multiplying 2 two-digit numbers by breaking apart the numbers and using place value to multiply in order to find the partial products and the product.

Monitor and Confirm

- Check for understanding that:
 - 16 and 28 are broken apart by place value in both the area model and the partial products model
 - each of the four sections in the area model represents one partial product
 - each step in the partial products model shows the product in one section of the area model
 - the sum of the four partial products, 448, is the product of 28×16

Support Whole Class Discussion

- Be sure students understand that problem 4 is asking them about breaking apart the factor 28 in a different way and that problem 5 is asking how to check that the answer to a two-digit multiplication problem is reasonable.

Ask Why might you be likely to break apart 28 into $10 + 10 + 8$ instead of into $20 + 8$? How does this affect the partial products you get and the product?

Listen for It is easy to multiply by 10. The partial products are different, but their sum, the product, is the same. You can break apart a factor in different ways to multiply, and the product stays the same.

Ask How is it helpful to use easier numbers to check the reasonableness of your answer to a two-digit multiplication problem?

Listen for Multiplying with easier numbers is a quick way to check whether your answer makes sense.

- Look for the idea that you can use nearby multiples of 10 as factors because it is easy to multiply by multiples of 10.

REFLECT

Have all students focus on the strategies used to solve this problem. If time allows, have students share their responses with a partner.

CONNECT IT

Now you will use the problem from the previous page to help you understand how to multiply a two-digit number by a two-digit number.

- Why is the area model divided into four sections?
Each number in the expanded form of one factor is multiplied by each number in the expanded form of the other factor. Each section shows a product.
- How do the four steps in the multiplication using partial products in **Model It** relate to the four sections in the area model in **Picture It**?
Each step shows the product in one section of the area model.
- What is the sum of the partial products and also the product of 28 and 16?
448
- Would the product change if $20 + 8$ on the top of the area model were changed to $10 + 10 + 8$? Explain.
No, the product would be the same. Possible explanation: Instead of a partial product of 200, you would have two partial products of 100. Instead of a partial product of 120, you would have two partial products of 60. The sum of all the partial products would still be the same.
- How could you estimate to check the reasonableness of your answer to 28×16 by multiplying with easier numbers?
Possible answer: $30 \times 10 = 300$ and $30 \times 20 = 600$. My answer is between 300 and 600, so it is reasonable.

REFLECT

Look back at your **Try It**, strategies by classmates, and **Picture It** and **Model It**. Which models or strategies do you like best for multiplying a two-digit number by a two-digit number? Explain.

Some students may like drawing an area model because they can add the area of each section to find the product. Other students may like using partial products because they can add them to find the product.

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Hands-On Activity

Use base-ten blocks to multiply 2 two-digit numbers.

If... students are unsure about multiplying two-digit numbers using partial products, Then... use this activity to have them multiply using base-ten blocks.

Materials For each pair: base-ten blocks (2 hundreds flats, 14 tens rods, 19 ones units)

- Distribute base-ten blocks to each pair. Have partners use the steps below to model 23×14 using base-ten blocks in a way similar to that of an area model.
- Model the factor 23 on a flat surface by displaying 2 tens rods and 3 ones units side by side in a single horizontal row.
- Model the factor 14 by displaying 1 tens rod and 4 ones units in a single vertical column to the left of and just beneath the horizontal row showing 23.
- Find each partial product by filling the area inside with the corresponding values: 2 hundred flats, 3 tens rods, 8 tens rods, and 12 ones units.
- The product is the value of the inside blocks. $[200 + 110 + 12 = 322]$
- Repeat the activity for another two-digit multiplication, such as 24×12 .

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APPLY IT

For all problems, encourage students to draw some kind of model to support their thinking. Allow some leeway in precision of student-drawn models.

- 7 567; See completed area model on the Student Worktext page; Students may add the partial products in any order to find the product.
8 851; See possible work on the Student Worktext page; Students may also make an area model to find the product.

Close: Exit Ticket

- 9 A; $10 \times 64 = 640$
D; $(30 + 2) \times 20 = (30 \times 20) + (2 \times 20) = 600 + 40 = 640$
E; $(40 \times 10) + (40 \times 6) = 400 + 240 = 640$

Error Alert If students choose B, then have them break apart each factor in 60×40 and rewrite the product as $(6 \times 10) \times (4 \times 10)$ and then change the order of the factors to $6 \times 4 \times 10 \times 10$, resulting in 24×100 , to recognize that the product is 2,400, not 640.

LESSON 12 DEVELOP

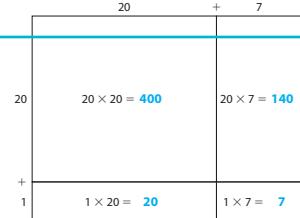
SESSION 2 ● ● ○

APPLY IT

Use what you just learned to solve these problems.

- 7 Complete the area model below. Then add the partial products to find the product of 27 and 21. Show your work.

Possible student work:



- Solution 567

- 8 Find 37 × 23. Show your work.

Possible student work:

$$\begin{array}{r} 37 \\ \times 23 \\ \hline 21 \\ 90 \\ 140 \\ + 600 \\ \hline 851 \end{array}$$

Solution 851

- 9 Select all the expressions that have a product of 640.

- A 10×64
B 60×40
C 80×80
D $(30 + 2) \times 20$
E $(40 \times 10) + (40 \times 6)$

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Apply It solutions at point of use give a correct response with explanations that include multiple approaches to solving the problem.

Close: Exit Ticket is a quick formative assessment of each day's learning and serves as an indicator of students' progress toward mastery or partial mastery of the learning goal of the session.

Error Alert gives insight into misconceptions that can lead to errors in calculation and provides on-the-spot remediation.

Using a Session

Teacher's Guide

continued

Additional Practice can be used as in-class small group work, after-class work, or at-home learning.

Solutions are labeled as *Basic*, *Medium*, and *Challenge* to support independent practice that can be differentiated as needed.

Fluency & Skills Practice provides ongoing opportunities for students to accurately, flexibly, and efficiently practice mathematical procedures and operations. This can be used as in-class small group work, after-class work, or at-home learning. Student pages are available on the Teacher Toolbox.

LESSON 12 SESSION 2 Additional Practice

Solutions

- 1 See completed multiplication using partial products on the student page.
Basic
- 2 $71 \times 48 = 2,800 + 560 + 40 + 8 = 3,408$; Students may add partial products in any order. See possible student work showing an area model on the student page.
Medium

Name: _____

LESSON 12 SESSION 2

Practice Multiplying by Two-Digit Numbers

Study the Example showing how to multiply a two-digit number by a two-digit number to solve a word problem. Then solve problems 1–6.

EXAMPLE

Aaron spends 35 minutes at each guitar lesson. He has 12 guitar lessons. How many minutes does Aaron spend at his guitar lessons?

Use an area model to multiply 35 by 12.

30	+	5
1 ten × 3 tens = 3 hundreds		1 ten × 5 = 5 tens
300		50
2		
2 × 3 tens = 6 tens		2 × 5 = 10
60		

$$300 + 50 + 60 + 10 = 420$$

Aaron spends 420 minutes at his guitar lessons.



- 1 Look at the Example above. Use partial products to multiply 35 by 12. Fill in the blanks.

$$\begin{array}{r} 3 & 5 \\ \times 1 & 2 \\ \hline 1 & 0 \rightarrow 2 \text{ ones} \times 5 \text{ ones} \\ 6 & 0 \rightarrow 2 \text{ ones} \times 3 \text{ tens} \\ + & 5 & 0 \rightarrow 1 \text{ ten} \times 5 \text{ ones} \\ + & 3 & 0 & 0 \rightarrow 1 \text{ ten} \times 3 \text{ tens} \\ \hline 4 & 2 & 0 \end{array}$$

- 2 Show how to use an area model to multiply 71 by 48.

70	+	1
40	$40 \times 70 = 2,800$	$40 \times 1 = 40$
+ 8	$8 \times 70 = 560$	$8 \times 1 = 8$

Possible model shown.
Students may add partial products in any order.

$$71 \times 48 = 2,800 + 560 + 40 + 8 = 3,408$$

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Fluency & Skills Practice

Teacher Toolbox 

Assign Multiplying by Two-Digit Numbers

In this activity students use estimation to check that two two-digit numbers have been multiplied correctly. Students may use rounding or another estimation strategy to check the reasonableness of the given answer. If students do not think the answer is reasonable, then they multiply to find the correct product. Students may apply the same process in real-world situations. For example, suppose a bowling team buys 12 T-shirts at \$14 each. The team may want to check that the total price they are charged is reasonable.

Multiplying by Two-Digit Numbers	
Multiplication Problems	Student Answers
14 × 17	238
15 × 19	285
21 × 18	3,078
16 × 13	208

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Lesson 12 Multiply by Two-Digit Numbers

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LESSON 12 SESSION 2

3 3,408; See multiplication with partial products on the student page.
Medium

4 A (True);
D (False);
F (False);
G (True)
Medium

5 1,120 glass tiles; 28 rounds to 30; $30 \times 40 = 1,200$. 1,200 is close to 1,120. My answer is reasonable. Students may use an area model or partial products to show that $28 \times 40 = 1,120$.
Medium

6 1,560 minutes; Students may show two different models such as area models and partial products or show various groupings to multiply. See possible student work on the student page.
Challenge

3 Show how to use partial products to multiply 48 by 71.

$$\begin{array}{r}
 48 \\
 \times 71 \\
 \hline
 8 \\
 40 \\
 560 \\
 + 2,800 \\
 \hline
 3,408
 \end{array}$$

4 Tell whether each equation is *True* or *False*.

	True	False
$18 \times 42 = (10 \times 40) + (10 \times 2) + (8 \times 40) + (8 \times 2)$	(A)	(B)
$60 \times 15 = (6 \times 10) + (6 \times 5)$	(C)	(D)
$37 \times 22 = (30 \times 20) + (30 \times 2) + (7 \times 20) + (7 \times 2)$	(E)	(F)
$99 \times 11 = (1 \times 9) + (1 \times 90) + (10 \times 9) + (10 \times 90)$	(G)	(H)

5 Mr. Greene prepares 28 bags of glass tiles for his art class. He puts 40 glass tiles in each bag. How many glass tiles does Mr. Greene use? Estimate to check that your answer is reasonable. Show your work.
Students may use an area model or partial products to show that $28 \times 40 = 1,120$.



Solution 1,120 glass tiles; 28 rounds to 30; $30 \times 40 = 1,200$. 1,200 is close to 1,120. My answer is reasonable.

6 Stephanie has 6 classes a day at school. Each class is 52 minutes long. She goes to school 5 days a week. How much time does she spend in class each week? Show two different ways to solve this problem. Show your work.
Answers will vary. Possible answer:
Way 1: first multiply 6×5 , then multiply 30×52 .
Way 2: multiply 6×52 , then 312×5 .
Students may show 2 different models for multiplying (area model and partial products) or show various groupings to multiply.

ELL English Language Learners: Differentiated Instruction

Prepare for Session 3
Use with *Apply It*.

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Levels 1–3

Listening/Writing Use with *Apply It* problem 9. Display the following questions:
1. *What will the problem be about?*
2. *What 2 two-digit numbers will be used?*
3. *What will you find out?*
Read the first question. Ask students to make suggestions. If needed, show pictures, such as cookies on platters or books on shelves. Read the second question. Ask students to identify 2 two-digit numbers. Read the third question. Model using the following sentence frames to write a word problem: *I have 42 cookies on 13 plates. How many cookies do I have in all?* Ask students to make original problems using the sentence frames.

Levels 2–4

Writing/Speaking Have students work in pairs. Read *Apply It* problem 9 with students. Provide the following questions to guide pairs in writing their own word problem:
1. *Who is your problem about?*
2. *What is your problem about?*
3. *What 2 two-digit numbers will you multiply in the problem?*
4. *What do you want to find out?*
When partners have completed writing their word problems, have them explain to each other how they will find the answer. Suggest students use sequencing words (*first, next, then*) to help them organize their thoughts. Call on pairs to read their word problems to the class.

Levels 3–5

Writing/Reading Use with *Apply It* problem 9. Have students write word problems, referring to the following guiding questions as needed:
1. *Who is your problem about?*
2. *What is your problem about?*
3. *What 2 two-digit numbers will you multiply in the problem?*
4. *What do you want to find out?*
Have students exchange their word problems. Say: *Read your partner's word problem. Then explain to your partner how you will find the answer.* When students have completed the activity, have them record their word problems and explanations in their math journal.

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Lesson 12 Multiply by Two-Digit Numbers **262**

ELL Differentiated Instruction provides scaffolds for the next session so teachers can focus on productive struggle when solving mathematics problems by addressing language needs throughout the lesson.