

North Penn School District
Elementary Math Parent Letter

Grade 4

Unit 1 – Chapter 3: Multiply by 2-Digit Numbers

Examples for each lesson:

Lesson 3.1

Multiply by Tens

One section of seating at an arena has 40 rows. Each row has 30 seats. How many seats in all are in that section?

Multiply. 30×40

Step 1 Think of each factor as a multiple of 10 and as a repeated addition.

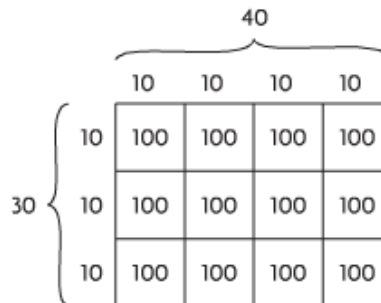
$$40 = \underline{4} \times \underline{10} \text{ or } \underline{10} + \underline{10} + \underline{10} + \underline{10}$$

$$30 = \underline{3} \times \underline{10} \text{ or } \underline{10} + \underline{10} + \underline{10}$$

Step 2 Draw a diagram to show the multiplication.

Step 3 Each small square in the diagram shows 10×10 , or 100. Count the squares.

There are 12 squares of 100.



Step 4 Use patterns and mental math to find 12×100 .

$$12 \times 1 = \underline{12}$$

$$12 \times 10 = \underline{120}$$

$$12 \times 100 = \underline{1,200}$$

There are 1,200 seats in that section.

More information on this strategy is available on Animated Math Model #11.

Lesson 3.2

Estimate Products

You can use rounding and compatible numbers to estimate products.

Use mental math and rounding to estimate the product.

Estimate. $62 \times \$23$

Step 1 Round each factor to the nearest ten.

62 rounds to 60.
\$23 rounds to \$20.

Step 2 Rewrite the problem using the rounded numbers.

$60 \times \$20$

Step 3 Use mental math.

$6 \times \$2 = \12
 $6 \times \$20 = \120
 $60 \times \$20 = \$1,200$

So, $62 \times \$23$ is about \$1,200.

Use mental math and compatible numbers to estimate the product.

Estimate. 24×78

Step 1 Use compatible numbers. 25×80

Step 2 Use $25 \times 4 = 100$ to help find 25×8 .
 $25 \times 8 = 200$

24×78
↓ ↓
 $25 \times 80 = 2,000$

Step 3 Since 80 has 1 zero, write 1 zero to the right of the product.

So, 24×78 is about 2,000.

More information on this strategy is available on Animated Math Model #7.

Lesson 3.3

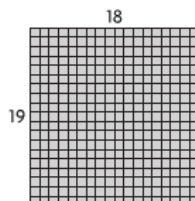
Area Models and Partial Products

You can use area models to multiply 2-digit numbers by 2-digit numbers.

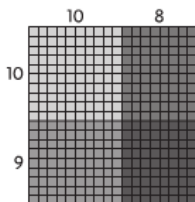
Use the model and partial products to solve.

Draw a rectangle to find 19×18 .

The rectangle is 19 units long and 18 units wide.



Step 1 Break apart the factors into tens and ones.
Divide the area model into four smaller rectangles to show the factors.



Step 2 Find the products for each of the smaller rectangles.

$10 \times 10 = 100$ $10 \times 8 = 80$ $9 \times 10 = 90$ $9 \times 8 = 72$

Step 3 Find the sum of the products. $100 + 80 + 90 + 72 = 342$

So, $19 \times 18 = 342$.

Lesson 3.4

Multiply Using Partial Products

Multiply 25×43 . Record the product.

Think: I can use partial products to find 25×43 .

		tens	ones	
				4 3
Step 1 Multiply the tens by the tens. 20×4 tens = 80 tens, or 800.	→			$\begin{array}{r} \times 25 \\ \hline 800 \end{array}$
Step 2 Multiply the ones by the tens. 20×3 ones = 60 ones, or 60.	→			6 0
Step 3 Multiply the tens by the ones. 5×4 tens = 20 tens, or 200.	→			2 0 0
Step 4 Multiply the ones by the ones. 5×3 ones = 15 ones, or 15.	→			$\begin{array}{r} + 15 \\ \hline \end{array}$
Step 5 Add the partial products. $800 + 60 + 200 + 15 = 1,075$.	→			1,075

So, $25 \times 43 = \underline{1,075}$.

Lesson 3.5

Multiply with Regrouping

Estimate. Then use regrouping to find 28×43 .

Step 1 Round to estimate the product. $30 \times 40 = 1,200$

Step 2 Think: $28 = 2$ tens 8 ones.
Multiply 43 by 8 ones.
 $8 \times 3 = 24$. Record the 4. Write the regrouped 2 above the tens place.
 $8 \times 40 = 320$. Add the regrouped tens: $320 + 20 = 340$.

$\begin{array}{r} 43 \\ \times 28 \\ \hline 344 \end{array}$	←	8×43
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Step 3 Multiply 43 by 2 tens.
 $20 \times 3 = 60$ and $20 \times 40 = 800$.
Record 860 below 344.

$\begin{array}{r} 43 \\ \times 28 \\ \hline 344 \\ 860 \end{array}$	←	20×43
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Step 4 Add the partial products.

$1,204$	←	$344 + 860$
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So, $28 \times 43 = \underline{1,204}$. 1,204 is close to 1,200. The answer is **reasonable**.

More information on this strategy is available on Animated Math Model #12.

Choose a Multiplication Method

Estimate. Then use regrouping to find 47×89 .

$$\begin{array}{r} 89 \\ \times 47 \\ \hline \end{array}$$

Step 1 Estimate the product.

$$50 \times 90 = 4,500$$

Step 2 Multiply the 9 ones by the 7 ones. Regroup the 63 ones as 6 tens 3 ones.

$$\begin{array}{r} \overset{6}{8}9 \\ \times 47 \\ \hline 3 \end{array}$$

Step 3 Multiply the 8 tens, or 80, by the 7 ones, or 7. Add the regrouped tens. Regroup the 62 tens as 6 hundreds 2 tens.

$$\begin{array}{r} \overset{6}{8}9 \\ \times 47 \\ \hline 623 \end{array}$$

Step 4 Multiply the 9 ones by the 4 tens, or 40. Regroup the 36 tens as 3 hundreds 6 tens.

$$\begin{array}{r} \overset{3}{8}9 \\ \times 47 \\ \hline 623 \\ 60 \end{array}$$

Step 5 Multiply the 8 tens, or 80, by the 4 tens, or 40. Add the regrouped tens. Regroup the 35 hundreds as 3 thousands 5 hundreds.

$$\begin{array}{r} \overset{3}{8}9 \\ \times 47 \\ \hline 623 \\ 3,560 \end{array}$$

Step 6 Add the partial products.

$$\begin{array}{r} \overset{3}{8}9 \\ \times 47 \\ \hline 623 \\ + 3,560 \\ \hline 4,183 \end{array}$$

So, $47 \times 89 = 4,183$. Since 4,183 is close to the estimate of 4,500, it is reasonable.

More information on this strategy is available on Animated Math Model #12.

Lesson 3.7

Problem Solving • Multiply 2-Digit Numbers

A library ordered 17 cases with 24 books in each case. In 12 of the cases, 18 books were fiction books. The rest of the books were nonfiction. How many nonfiction books did the library order?

Read the Problem	Solve the Problem
<p>What do I need to find?</p> <p>I need to find <u>how many nonfiction books</u> were ordered.</p>	<ul style="list-style-type: none">• First, find the total number of books ordered. $17 \times 24 = 408$ books ordered• Next, find the number of fiction books. $12 \times 18 = 216$ fiction books• Last, draw a bar model. I need to subtract.
<p>What information do I need to use?</p> <p><u>17</u> cases of <u>24</u> books each were ordered.</p> <p>In <u>12</u> cases, <u>18</u> books were fiction books.</p>	<p>408 books ordered</p> <p>216 fiction books</p> <p>?</p>
<p>How will I use the information?</p> <p>I can find the <u>total number of books ordered</u> and the <u>number of fiction books ordered</u>.</p> <p>Then I can draw a bar model to compare the <u>total number of books</u> to the <u>number of fiction books</u>.</p>	<p>$408 - 216 = 192$</p> <p>So, the library ordered <u>192</u> nonfiction books.</p>

Vocabulary

Compatible numbers – numbers that are easy to compute with mentally

Associative Property of Multiplication – the property that states that when the grouping of factors is changed, the product remains the same

Commutative Property of Multiplication – the property that states when the order of two factors is changed, the product remains the same

Estimate – to find an answer that is close to the exact amount

Partial product – a method of multiplying in which the ones, tens, hundreds, and so on are multiplied separately and then the products are added together

Product – the answer in a multiplication problem

Regroup – to exchange amounts of equal value to rename a number

