North Penn School District

Elementary Math Parent Letter

Grade 4

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

Examples for each lesson:

Lesson 2.1

Algebra • Multiplication Comparisons

Tara has 3 times as many soccer medals as Greg. Greg has 4 soccer medals. How many soccer medals does Tara have?

Step 1 Draw a model.

Greg ◯◯◯◯

Tara ◯◯◯◯ ◯◯◯◯ ◯◯◯◯

Step 2 Use the model to write an equation.

$n = \underline{3} \times \underline{4}$ **Think:** n is how many soccer medals Tara has.

Step 3 Solve the equation.

$n = \underline{12}$

So, Tara has $\underline{12}$ soccer medals.

Lesson 2.2

Algebra • Comparison Problems

Jamie has 3 times as many baseball cards as Rick. Together, they have 20 baseball cards. How many cards does Jamie have?

Step 1 Draw a box with the letter n in it to show that Rick has an unknown number of cards. Jamie has 3 times as many cards as Rick, so draw three identical boxes to represent Jamie's cards.

Jamie | n | n | n | ⎤
                              ⎟ 20
Rick | n | ⎦

Step 2 Use the model to write an equation.
   Think: There are 4 equal bars. The number in each bar is represented by n.

There are a total of 20 cards. So, $\underline{4} \times n = \underline{20}$.

Step 3 Solve the equation to find the value of n.
   Think: 4 times what number is 20?

Since $4 \times \underline{5} = 20$, the value of n is $\underline{5}$.

Rick has $\underline{5}$ cards.

Step 4 Find how many cards Jamie has.
   Think: Jamie has 3 times as many cards as Rick.

So, Jamie has $3 \times \underline{5} = \underline{15}$ baseball cards.

Lesson 2.3

Multiply Tens, Hundreds, and Thousands

You can use a pattern to multiply with tens, hundreds, and thousands.

Count the number of zeros in the factors.

$4 \times 6 = 24$ ← basic fact

$4 \times 60 = 240$ ← When you multiply by tens, the last digit in the product is 0.

$4 \times 600 = 2,400$ ← When you multiply by hundreds, the last <u>two</u> digits in the product are 0.

$4 \times 6,000 = 24,000$ ← When you multiply by thousands, the last <u>three</u> digits in the product are 0.

When the basic fact has a zero in the product, there will be an extra zero in the final product:

$5 \times 4 = 20$, so $5 \times 4,000 = 20,000$

More information on this strategy is available on Animated Math Model #5.

Lesson 2.4

Estimate Products

You can use rounding to estimate products.

Round the greater factor. Then use mental math to estimate the product.

6×95

Step 1 Round 95 to the nearest hundred.   95 rounds to 100.

Step 2 Use patterns and mental math. $6 \times 1 = 6$

     $6 \times 10 = 60$

     $6 \times 100 = 600$

Find two numbers the exact answer is between.

7×759

Step 1 Estimate by rounding to the lesser hundred.	**Step 2** Estimate by rounding to the greater hundred.

7×759 **Think:** $7 \times 7 = 49$
      $7 \times 70 = 490$
      $7 \times 700 = 4,900$
 $7 \times 700 = 4,900$
	7×759 **Think:** $7 \times 8 = 56$
	      $7 \times 80 = 560$
	      $7 \times 800 = 5,600$
	 $7 \times 800 = 5,600$

So, the product is between 4,900 and 5,600.

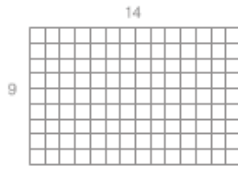More information on this strategy is available on Animated Math Models #6, 7.

Lesson 2.5

Multiply Using the Distributive Property

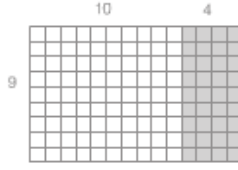You can use rectangular models to multiply 2-digit numbers by 1-digit numbers.

14

9

Find 9 × 14.

Step 1 Draw a 9 by 14 rectangle on grid paper.

10   4

9

Step 2 Use the Distributive Property and products you know to break apart the model into two smaller rectangles.
Think: 14 = 10 + 4.

Step 3 Find the product each smaller rectangle represents.

$9 \times 10 = 90$

$9 \times 4 = 36$

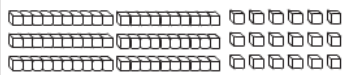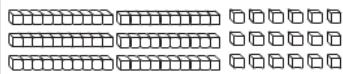**Step 4** Find the sum of the products. $90 + 36 = 126$

So, $9 \times 14 = 126$.

More information on this strategy is available on Animated Math Model #8.

Lesson 2.6

Multiply Using Expanded Form

You can use expanded form or a model to find products.

Multiply. 3×26

Think and Write	Use a Model
Step 1 Write 26 in expanded form.	**Step 1** Show 3 groups of 26.
$26 = 20 + 6$	
$3 \times 26 = 3 \times (20 + 6)$	
Step 2 Use the Distributive Property.	**Step 2** Break the model into tens and ones.
$3 \times 26 = (3 \times 20) + (\underline{\ 3\ } \times \underline{\ 6\ })$	
Step 3 Multiply the tens. Multiply the ones.	$(3 \times 2 \text{ tens})$ $(3 \times 6 \text{ ones})$
$3 \times 26 = (3 \times 20) + (3 \times 6)$	(3×20) (3×6)
$= \underline{\ 60\ } + \underline{\ 18\ }$ 60	$\underline{\ 60\ }$ $\underline{\ 18\ }$
+18	
Step 4 Add the partial products. 78	**Step 3** Add to find the total product.
	$\underline{\ 60\ } + \underline{\ 18\ } = \underline{\ 78\ }$
So, $3 \times 26 = \underline{\ 78\ }$.	

Lesson 2.7

Multiply Using Partial Products

Use partial products to multiply.

Multiply. 7 × $332

Step 1 Estimate the product.	332 rounds to 300; 7 × $300 = $2,100 .	
Step 2 Multiply the 3 hundreds, or 300, by 7.	$332 × 7	or	$300 × 7 $2,100
Step 3 Multiply the 3 tens, or 30, by 7.	$332 × 7	or	$30 × 7 $210
Step 4 Multiply the 2 ones, or 2, by 7.	$332 × 7	or	$2 × 7 $14
Step 5 Add the partial products.	$2,100 + $210 + $14 = $2,324	

So, 7 × $332 = $2,324. Since $2,324 is close to the estimate of $2,100, it is reasonable.

Lesson 2.8

Multiply Using Mental Math

Use addition to break apart the larger factor.	Use subtraction to break apart the larger factor.
Find 8 × 214.	**Find 6 × 298.**
Think: 214 = 200 + 14	**Think:** 298 = 300 − 2
8 × 214 = (8 × 200) + (8 × 14)	6 × 298 = (6 × 300) − (6 × 2)
= 1,600 + 112	= 1,800 − 12
= 1,712	= 1,788
Use halving and doubling.	When multiplying more than two numbers, use the Commutative Property to change the order of the factors.
Find 14 × 50.	**Find 2 × 9 × 50.**
Think: 14 can be evenly divided by 2.	**Think:** 2 × 50 = 100
14 ÷ 2 = 7	2 × 9 × 50 = 2 × 50 × 9
7 × 50 = 350	= 100 × 9
2 × 350 = 700	= 900

More information on this strategy is available on Animated Math Model #8.

Lesson 2.9

Problem Solving • Multistep Multiplication Problems

Use the strategy *draw a diagram* to solve a multistep multiplication problem.

Amy planted 8 rows with 18 tulips in each row. In each of the 4 middle rows, there are 4 red tulips. All of the other tulips are yellow. How many of the tulips are yellow tulips?

Read the Problem	Solve the Problem
What do I need to find? I need to find the total number of _yellow_ tulips.	I drew a diagram for each color of tulip. 18 tulips 4 rows — RRRR RRRR RRRR RRRR — 8 rows 4 tulips
What information do I need to use? There are __8__ rows of tulips with __18__ tulips in each row. There are __4__ rows of tulips with __4__ red tulips in each row.	Next, I found the number in each section. **All Tulips** **Red Tulips** $8 \times 18 = 144$ $4 \times 4 = 16$
How will I use the information? I can __multiply__ to find the total number of tulips and the number of red tulips. Then I can __subtract__ to find the number of yellow tulips.	Last, I subtracted the number of red tulips from the total number of tulips. $\underline{144} - \underline{16} = \underline{128}$ So, there are __128__ yellow tulips.

Lesson 2.10

Multiply 2-Digit Numbers with Regrouping

Use place value to multiply with regrouping.

Multiply. 7×63

Step 1 Estimate the product. $7 \times 60 = 420$

Step 2 Multiply the ones. Regroup 21 ones as 2 tens 1 one. Record the 1 one below the ones column and the 2 tens above the tens column.

$$\begin{array}{r} \overset{2}{63} \\ \times\ 7 \\ \hline 1 \end{array}$$

7×3 ones $= 21$ ones

Step 3 Multiply the tens. Then, add the regrouped tens. Record the tens.

$$\begin{array}{r} \overset{2}{63} \\ \times\ 7 \\ \hline 441 \end{array}$$ 44 tens = 4 hundreds
4 tens

7×6 tens $= 42$ tens

Add the 2 regrouped tens.

42 tens + 2 tens = 44 tens

So, $7 \times 63 = 441$. Since 441 is close to the estimate of 420, it is reasonable.

More information on this strategy is available on Animated Math Model #9.

Multiply 3-Digit and 4-Digit Numbers with Regrouping

When you multiply 3-digit and 4-digit numbers, you may need to regroup.

Estimate. Then find the product.
$$\begin{array}{r} \$1,324 \\ \times \quad 7 \\ \end{array}$$

Step 1 Estimate the product. $1,324 rounds to $1,000; $1,000 × 7 = $7,000.

Step 2 Multiply the 4 ones by 7.
Regroup the 28 ones as 2 tens 8 ones.
$$\begin{array}{r} ^{2} \\ \$1,324 \\ \times \quad 7 \\ \hline 8 \end{array}$$

Step 3 Multiply the 2 tens by 7.
Add the regrouped tens.
Regroup the 16 tens as 1 hundred 6 tens.
$$\begin{array}{r} ^{1\,2} \\ \$1,324 \\ \times \quad 7 \\ \hline 68 \end{array}$$

Step 4 Multiply the 3 hundreds by 7.
Add the regrouped hundred.
Regroup the 22 hundreds as 2 thousands
2 hundreds.
$$\begin{array}{r} ^{2\,1\,2} \\ \$1,324 \\ \times \quad 7 \\ \hline 268 \end{array}$$

Step 5 Multiply the 1 thousand by 7.
Add the regrouped thousands.
$$\begin{array}{r} ^{2\,1\,2} \\ \$1,324 \\ \times \quad 7 \\ \hline \$9,268 \end{array}$$

So, 7 × $1,324 = $9,268.
Since $9,268 is close to the estimate of $7,000, the answer is reasonable.

More information on this strategy is available on Animated Math Model #10.

Lesson 2.12

Algebra • Solve Multistep Problems Using Equations

The **Order of Operations** is a special set of rules which gives the order in which calculations are done in an expression. First, multiply and divide from left to right. Then, add and subtract from left to right.

Use the order of operations to find the value of n.

$$6 \times 26 + 3 \times 45 - 11 = n$$

Step 1 Circle the first multiplication expression in the equation.

$$\boxed{6 \times 26} + 3 \times 45 - 11 = n$$

Step 2 Multiply 6×26.

$$\underline{156} + 3 \times 45 - 11 = n$$

Step 3 Circle the next multiplication expression in the equation.

$$156 + \boxed{3 \times 45} - 11 = n$$

Step 4 Multiply 3×45.

$$156 + \underline{135} - 11 = n$$

Step 5 There are no more multiplication or division expressions. Circle the first addition expression in the equation.

$$\boxed{156 + 135} - 11 = n$$

Step 6 Add $156 + 135$.

$$\underline{291} - 11 = n$$

Step 7 Subtract $291 - 11$.

$$\underline{280} = n$$

Vocabulary

Distributive Property – the property that states that multiplying a sum by a number is the same as multiplying each addend by the number and then adding the products

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

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

Expanded form – a way to write numbers by showing the value of each digit

Factor – a number that is multiplied by another number to find a product

Round – to replace a number with another number that tells about how many or how much