Chapter 6: Multiplication

1. Calculate each product.
   a) $6 \times 2 = \underline{\hspace{2cm}}$
   b) $5 \times 5 = \underline{\hspace{2cm}}$
   c) $3 \times 6 = \underline{\hspace{2cm}}$
   d) $4 \times 4 = \underline{\hspace{2cm}}$
   e) $3 \times 7 = \underline{\hspace{2cm}}$
   f) $4 \times 7 = \underline{\hspace{2cm}}$
   g) $5 \times 7 = \underline{\hspace{2cm}}$
   h) $6 \times 6 = \underline{\hspace{2cm}}$
   i) $6 \times 4 = \underline{\hspace{2cm}}$
   j) $6 \times 8 = \underline{\hspace{2cm}}$
   k) $7 \times 9 = \underline{\hspace{2cm}}$
   l) $9 \times 8 = \underline{\hspace{2cm}}$

2. Calculate.
   a) $7 \times 10 = \underline{\hspace{2cm}}$
   b) $7 \times 60 = \underline{\hspace{2cm}}$
   c) $4 \times 90 = \underline{\hspace{2cm}}$
   d) $50 \times 8 = \underline{\hspace{2cm}}$
   e) $30 \times 9 = \underline{\hspace{2cm}}$
   f) $20 \times 8 = \underline{\hspace{2cm}}$
   g) $3 \times 100 = \underline{\hspace{2cm}}$
   h) $7 \times 100 = \underline{\hspace{2cm}}$
   i) $9 \times 500 = \underline{\hspace{2cm}}$
   j) $700 \times 7 = \underline{\hspace{2cm}}$
   k) $300 \times 8 = \underline{\hspace{2cm}}$
   l) $600 \times 2 = \underline{\hspace{2cm}}$
Exploring Multiplication

GOAL

Use your own strategies to solve everyday math problems.

1. Circle the problem that can be solved using multiplication.
   
   A. Matt read 22 pages on Monday, 29 pages on Tuesday, and 27 pages on Thursday. How many pages did he read altogether?
   
   B. Diane read on Monday, Tuesday, and Thursday. She read 31 pages each day. How many pages did she read altogether?
   
   C. Jade read 96 pages in total on Monday, Tuesday, and Thursday. How many pages did she read each day?
   
   D. Cole read 37 pages on Monday. Lang read 29 pages on Monday. How many more pages did Cole read than Lang?

   Explain how you know this problem can be solved using multiplication.

2. Solve the problem you circled in Question 1.

3. Emily, Kate, Hailey, and Annie each have $22. How much money do the 4 girls have altogether?
Chapter 9
Lesson 2

Multiplying 10s and 100s

GOAL
Use patterns to multiply 10s and 100s.

1. Multiply.
   a) $4 \times 1 =$
   b) $4 \times 2 =$
   c) $4 \times 5 =$
   d) $4 \times 10 =$
   e) $4 \times 20 =$
   f) $4 \times 50 =$
   g) $4 \times 100 =$
   h) $4 \times 200 =$
   i) $4 \times 500 =$

2. Multiply.
   a) $5 \times 10 =$
   b) $60 \times 3 =$
   c) $8 \times 100 =$
   d) $70 \times 4 =$
   e) $2 \times 200 =$
   f) $9 \times 30 =$
   g) $500 \times 5 =$
   h) $40 \times 6 =$
   i) $7 \times 300 =$
   j) $90 \times 4 =$
   k) $10 \times 6 =$
   l) $4 \times 800 =$

3. Kate found four $100 bills.
   How much money did she find?

4. Lang is building a model of the school using blocks.
   He bought 8 sets of 30 blocks.
   How many blocks does he have in total?
Multiplying by 10

Multiply 10 \times 16.

Think: \(1 \times 16 = 16\), so \(10 \times 16 = 160\)

When you multiply by 10, think of multiplying by 1. Then write a 0.

1. Since I know \(23 \times 1 = \underline{23}\),
   I also know \(23 \times 10 = \underline{230}\).

2. Since I know \(45 \times 1 = \underline{45}\),
   I also know \(45 \times 10 = \underline{450}\).

3. Since I know \(98 \times 1 = \underline{98}\),
   I also know \(98 \times 10 = \underline{980}\).

4. Since I know \(1 \times 36 = \underline{36}\),
   I also know \(10 \times 36 = \underline{360}\).

5. Since I know \(60 \times 1 = \underline{60}\),
   I also know \(60 \times 10 = \underline{600}\).

6. Since I know \(1 \times 72 = \underline{72}\),
   I also know \(10 \times 72 = \underline{720}\).

Multiply these pairs of factors.

7. \(85 \times 1 = \underline{85}\)
   \(85 \times 10 = \underline{850}\)

8. \(38 \times 1 = \underline{38}\)
   \(38 \times 10 = \underline{380}\)

9. \(572 \times 1 = \underline{572}\)
   \(572 \times 10 = \underline{5720}\)

10. \(1 \times 443 = \underline{443}\)
    \(10 \times 443 = \underline{4430}\)

11. \(20 \times 1 = \underline{20}\)
    \(20 \times 10 = \underline{200}\)

12. \(1 \times 76 = \underline{76}\)
    \(10 \times 76 = \underline{760}\)

Multiply.

13. \(10 \times 35 = \underline{350}\)

14. \(69 \times 10 = \underline{690}\)

15. \(546 \times 10 = \underline{5460}\)

16. \(41 \times 10 = \underline{410}\)

17. \(10 \times 768 = \underline{7680}\)

18. \(10 \times 80 = \underline{800}\)
9.2 Multiplying 10s and 100s Page 1

Student Book pages 312–313

**GOAL**
Use patterns to multiply 10s and 100s.

**Problem**
Diane is making safety pin necklaces. She uses 100 beads and 10 safety pins to make each necklace.

How many does she need to make 5 necklaces?

**Step 1:** Use base ten blocks to model the number of beads in each necklace.
There are 100 beads in each necklace.
Use 5 hundreds blocks to show the beads.

Count by 100s to find out how many beads are needed for the 5 necklaces.

100, 200, ______, ______, ______
Diane needs ______ beads.

**Step 2:** Use base ten blocks to model the number of pins in each necklace.
There are 10 pins in each necklace.
Use 5 tens blocks to show the pins.

Count by 10s to find out how many pins are needed for the 5 necklaces.

10, 20, ______, ______, ______
Diane needs ______ pins.
9.2 Multiplying 10s and 100s Page 2

Step 3: You can use tables to organize your information and look for patterns.

Complete the tables below for up to 5 necklaces.

<table>
<thead>
<tr>
<th>Number of necklaces</th>
<th>Number of beads</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1 \times 1$ hundred = 1 hundred</td>
</tr>
<tr>
<td>2</td>
<td>$2 \times 1$ hundred = 2 hundreds</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Number of necklaces</th>
<th>Number of pins</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$1 \times 1$ ten = 1 ten</td>
</tr>
<tr>
<td>2</td>
<td>$2 \times 1$ ten = 2 tens</td>
</tr>
<tr>
<td>3</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
</tbody>
</table>

Reflecting

What patterns do you see in your tables?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
Tanvi was selling boxes of candy. Each box had 6 pieces of candy in it. The first week she sold 10 boxes. The second week she visited an apartment building where she sold 100 boxes. How many pieces of candy did she sell in all?

There are place-value patterns in multiplication that can help you multiply by 10s, 100s, or even 1,000s. This is great for saving time by using mental math.

1. Begin by finding the simple fact in the larger problem. This is $6 \times 1$, which is 6.

2. Count the 0s in the problem. In this case, there is one. This lets us know there will be one 0 in the product.

3. Write 6 with one 0 behind it to get the product of 60. Repeat the same three steps for the second part to get a product of 600.

In Tanvi's problem, we have to multiply $6 \times 10$ for the first week, which is 60. The second week is $6 \times 100 = 600$. Add 600 and 60 to see that she sold 660 pieces of candy.

**Practice**

Find the products.

1. $5 \times 10 = \underline{\hspace{2cm}}$

2. $5 \times 100 = \underline{\hspace{2cm}}$

3. $5 \times 1,000 = \underline{\hspace{2cm}}$

4. $10 \times 3 = \underline{\hspace{2cm}}$

5. $10 \times 30 = \underline{\hspace{2cm}}$

6. $10 \times 300 = \underline{\hspace{2cm}}$

7. $500 \times 4 = \underline{\hspace{2cm}}$

8. $50 \times 4 = \underline{\hspace{2cm}}$

9. $40 \times 50 = \underline{\hspace{2cm}}$

10. $2 \times 20 = \underline{\hspace{2cm}}$

11. $2 \times 200 = \underline{\hspace{2cm}}$

12. $20 \times 20 = \underline{\hspace{2cm}}$

**Journal**

How can multiplication patterns help you solve a problem like $16 \times 100$?
Multiplication Patterns

Find the products.

1. \(10 \times 8 = \) _____ 
2. \(10 \times 80 = \) _____ 
3. \(100 \times 8 = \) _____ 
4. \(1,000 \times 8 = \) _____ 
5. \(4 \times 40 = \) _____ 

6. \(400 \times 40 = \) _____ 
7. \(1 \times 400 = \) _____ 
8. \(40 \times 40 = \) _____ 
9. \(9 \times 10 = \) _____ 
10. \(90 \times 10 = \) _____ 

11. \(9 \times 20 = \) _____ 
12. \(90 \times 20 = \) _____ 
13. \(900 \times 20 = \) _____ 
14. \(20 \times 50 = \) _____ 
15. \(200 \times 50 = \) _____

Review.

16. What strategy could be used to solve \(8 \times 6\)? Explain.

17. What property of multiplication tells us that if \(3 \times 9 = 27\) then \(9 \times 3 = 27\)?

18. Give an example of a fact for the Half-Then-Double strategy.
## Multiplication

### Find the products mentally.

1. \(100 \times 7 = \) 
2. \(9 \times 10 = \) 
3. \(8 \times 1000 = \) 
4. \(10 \times 5 = \) 
5. \(1000 \times 2 = \) 
6. \(6 \times 100 = \) 
7. \(3 \times 1000 = \) 
8. \(12 \times 100 = \) 

### Quick Tip

When you multiply a number by 10, just add 1 zero to the number. Add 2 zeros when you multiply it by 100, and 3 zeros when you multiply it by 1000.

### Find the products.

9. \(3 \times 80 = \) 
10. \(50 \times 4 = \) 
11. \(4 \times 600 = \) 
12. \(2 \times 3000 = \) 
13. \(400 \times 3 = \) 
14. \(2000 \times 4 = \) 
15. \(400 \times 7 = \) 
16. \(2 \times 5000 = \) 
17. \(9 \times 20 = \) 
18. \(5 \times 400 = \) 
19. \(8 \times 70 = \) 
20. \(90 \times 5 = \) 
21. \(60 \times 6 = \) 
22. \(700 \times 9 = \) 
23. \(200 \times 8 = \) 
24. \(4000 \times 2 = \) 
25. \(500 \times 6 = \) 
26. \(40 \times 7 = \) 
27. \(3000 \times 9 = \) 
28. \(900 \times 4 = \)
Solve the problems.

Estimate

7  Daniel and Michelle went apple-picking. They filled 7 baskets with 275 apples each. How many apples did they pick?

\[ 300 \times 7 = 2100 \]

About 2100 apples

8  Julian’s school bus can carry 55 students each time. The bus is filled 6 times a day. How many students have been on the bus in one day?

9  The bleachers of Julian’s school have 5 sections. Each section can seat 125 people. How many people can sit in the bleachers?

10 Amanda has 7 boxes of cookies for sale in a fundraising event. Each box contains 24 packages of cookies. How many packages of cookies will Amanda have to sell?

Mind Boggler

What number am I?

I’m a 2-digit number smaller than 50. When I’m multiplied by 7, the product is greater than 200. The sum of my digits is 5.

You are _____.

9.3 Multiplying Using Arrays Page 1

Student Book pages 314–317

**GOAL**
Use arrays to visualize easier ways to multiply.

**Problem**
Alec has a game board that has 4 rows of 12 spaces.

**How can you calculate the number of spaces on Alec’s 4-by-12 game board?**

**Step 1:** The game board has 4 rows of 12 spaces.
Sketch it on grid paper.

![Grid paper diagram]

**Step 2:** $4 \times 12$ tells the number of spaces.
You already know $4 \times 10 = \square$.
You also know that $4 \times 2 = \square$.
Split the 4-by-12 array into a 4-by-10 array and a 4-by-2 array.
Colour and label both arrays as shown below.

![Array diagram]
9.3 Multiplying Using Arrays Page 2

Step 3: 4 rows of 10 = 4 × 10
4 rows of 2 = 4 × 2
Use 4 × 10 + 4 × 2 to calculate 4 × 12.
4 × 12 = 4 × 10 + 4 × 2
4 × 12 = _______ + _______
4 × 12 = _______
So, there are _______ spaces on Alec's game board.

Reflecting
How does splitting an array into smaller arrays help you to multiply?

What other ways can you split the 4-by-12 array to calculate 4 × 12?
9.3 Multiplying Using Arrays Page 1

Student Book pages 314-317

GOAL
Use arrays to visualize easier ways to multiply.

Checking

1. a) Complete the number sentence to show how the 5-by-14 array is shaded.

Look at the light grey part of the array.
How many rows are there in all? ________
How many light grey squares are in each row? ________
There are $5 \times ________$ squares in the light grey part of the array.

Look at the dark grey part of the array.
How many rows are there in all? ________
How many dark grey squares are in each row? ________
There are $5 \times ________$ squares in the dark grey part of the array.

The 5-by-14 array combines the 2 smaller arrays.
Complete the number sentence below.
$5 \times 14 = 5 \times ________ + 5 \times ________$

b) Complete the number sentences to calculate $5 \times 14$.
$5 \times 14 = 5 \times ________ + 5 \times ________$
$5 \times 14 = ________ + ________$
$5 \times 14 = ________$

You will need
- grid paper
- pencil crayons
3. Look at the different shades in the arrays below. Complete the number sentences.

\[
\begin{align*}
6 \times 12 &= 6 \times 10 + 6 \times \_ \_ \_ \\
6 \times 12 &= \_ \_ \_ + \_ \_ \_ \\
6 \times 12 &= \_ \_ \_ \\
\end{align*}
\]

\[
\begin{align*}
7 \times 11 &= \_ \_ \_ \times \_ \_ \_ + \_ \_ \_ \times \_ \_ \_ \\
7 \times 11 &= \_ \_ \_ + \_ \_ \_ \\
7 \times 11 &= \_ \_ \_ \\
\end{align*}
\]

9. Sketch arrays on grid paper to show that each statement is true.

\[
\begin{align*}
a) \quad 5 \times 23 &= 5 \times 20 + 5 \times 3 \\
b) \quad 5 \times 23 &= 5 \times 10 + 5 \times 10 + 5 \times 3 \\
c) \quad 5 \times 23 &= 5 \times 7 + 5 \times 7 + 5 \times 7 + 5 \times 2 \\
\end{align*}
\]
Scaffolding for Lesson 3, Questions 4 & 5

STUDENT BOOK PAGE 316

4. Jiri planted 7 rows of 18 trees. How many trees did he plant?

There are ____ rows with ____ trees in each.

So, there are ____ × ____ trees in all.

I can model this problem with an array that has ____ rows and ____ columns.

Draw the array on this grid.

Find and colour 2 smaller arrays inside the array.
Find the products of the 2 smaller arrays and add them together.

7 × 18 = 7 × ____ + 7 × ____
7 × 18 = ____ + ____
7 × 18 = ____
Jiri planted ____ trees.

5. Complete.

a) 6 × 21 = 6 × 20 + 6 × 1
   6 × 21 = ____ + ____
   6 × 21 = ____

c) 5 × 32 = 5 × 30 + 5 × ____
   5 × 32 = ____ + ____
   5 × 32 = ____

b) 4 × 16 = 4 × 8 + 4 × 8
   4 × 16 = ____ + ____
   4 × 16 = ____

d) 5 × 28 = 5 × ____ + 5 × ____
   5 × 28 = ____ + ____
   5 × 28 = ____
Multiplying Using Arrays

1. Fill in the blanks.
   a) 
   
   $3 \times 14 = 3 \times 10 + 3 \times \underline{\hspace{2cm}}$
   $3 \times 14 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
   $3 \times 14 = \underline{\hspace{2cm}}$
   
   b) 
   
   $6 \times 17 = 6 \times 10 + 6 \times \underline{\hspace{2cm}}$
   $6 \times 17 = \underline{\hspace{2cm}} + \underline{\hspace{2cm}}$
   $6 \times 17 = \underline{\hspace{2cm}}$

2. Sketch arrays to help you multiply.
   a) $5 \times 13 = \underline{\hspace{2cm}}$
   b) $7 \times 15 = \underline{\hspace{2cm}}$
   c) $2 \times 17 = \underline{\hspace{2cm}}$

3. Sketch an array to show that this statement is true.
   
   $4 \times 26 = 4 \times 20 + 4 \times 6$

At-Home Help

You can use an array to help you multiply. For example:

I want to calculate $8 \times 12$.
I already know that $8 \times 10 = 80$.

$8 \times 12 = 8 \times 10 + 8 \times 2$
$8 \times 12 = 80 + 16$
$8 \times 12 = 96$
9.4 Modelling Multiplication  Page 1

Student Book pages 318–321

GOAL
Modelling multiplication as equal groups.

Problem
Annie is making 54 leather bags.
She sews 3 designs on each bag.

How many designs will Annie sew?

Use expanded form to calculate.
5 tens + 4 ones

\[ \text{________} \times 3 \]

Step 1: 5 tens \times 3 = _______

Step 2: 4 ones \times 3 = _______

Step 3: 15 tens = _______

Step 4: 12 ones = _______

Step 5: 15 tens = _______ (see Step 3)
+ 12 ones = _______ (see Step 4)
\[ \text{Total } = _______ \]

Annie sewed _______ designs.
Reflecting

How does grouping tens and ones help you with multiplication?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________
2. Sam serves 4 trays of salmon.
   Each tray holds 32 pieces.
   How many pieces of salmon does Sam serve?

Follow these steps to calculate $4 \times 32$.

**Step 1: Expand**

\[ 32 \text{ is } \underline{\text{tens}} + 2 \text{ ones} \]

\[ \times 4 \quad \underline{\text{}} \times 4 \]

**Step 2: Multiply**

\[ 4 \times 32 \text{ is } \underline{\text{groups of 32}}. \]

Model 4 groups of 32 with base ten blocks on the place value chart.

**Step 3: Add**

\[ 32 \text{ is } 3 \text{ tens } + 2 \text{ ones} \]

\[ \times 4 \quad \underline{\text{}} \times 4 \]

\[ \underline{\text{tens}} \]

\[ \underline{\text{tens}} + \underline{\text{ones}} \]

Sam served ______ pieces of salmon.
9.4 Multiplying Using Expanded Form Page 2

Practising

5. Alasie made a bracelet with 6 rows of 64 beads.

   a) How did Alasie know she would need more than 350 beads?
       **Hint:** She can estimate.
       She can use a number close to 64 that is easy to multiply.
       For example, _______ is close to 64.
       Since $6 \times _______ = _______$, she knows she needs more than 350 beads.

   b) How many beads did she use altogether?
       **Hint:** Use base ten blocks to model this problem.

       ____ tens
       + ____ ones

       ___________ $\times$ 6

       ____ tens
       + ____ ones

       Alasie used _______ beads altogether.
### Solve the problems. Show your work.

<table>
<thead>
<tr>
<th>Problem</th>
<th>Description</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Mom bought 4 boxes of chocolate for May's birthday party. There were 36 chocolates in each box. How many chocolates did Mom buy?</td>
<td>$4 \times 36 = 144$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$30 \times 4 = 120$ [\frac{6}{144} ] $120/144$ [\frac{1}{1} ] $144$</td>
</tr>
<tr>
<td></td>
<td>Mom bought ___ chocolates.</td>
<td>144</td>
</tr>
<tr>
<td>2</td>
<td>There were 24 party hats in a bag. How many party hats were there in 3 bags?</td>
<td>$24 \times 3 = ___$</td>
</tr>
<tr>
<td></td>
<td>There was ___ party hats.</td>
<td>___</td>
</tr>
<tr>
<td>3</td>
<td>Mom bought 2 bags of straws with 98 straws in each bag. How many straws did Mom buy?</td>
<td>$90 + 8$ [\frac{8}{2} ] $98$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$10 + 8$ [\frac{4}{4} ] $18$</td>
</tr>
<tr>
<td>4</td>
<td>Ted and 4 friends each contributed $18 to buy a birthday gift for May. What was the cost of the birthday gift?</td>
<td>$40 + 2$ [\frac{2}{4} ] $42$</td>
</tr>
<tr>
<td>5</td>
<td>May put 42 cookies on a plate. How many cookies were there on 4 plates?</td>
<td>$40 + 2$ [\frac{2}{4} ] $42$</td>
</tr>
</tbody>
</table>

### Just for Fun

Solve the problem.

**Show how you can move the least number of beads to change the shape of the triangle on the left-hand side to that on the right-hand side.**

![Bead arrangement](image)
Multiplying 2-digit Numbers by 1-digit Numbers

Example

$4 \times 23 = ?$

Long way:

$\begin{array}{c}
2 & 3 \\
\times & 4 \\
\hline
1 & 2 \\
8 & 0 \\
9 & 2 \\
\hline
\end{array}$

$\begin{array}{c}
2 & 3 \\
\times & 4 \\
\hline
1 & 2 \\
9 & 2 \\
\hline
\end{array}$

$\begin{array}{c}
2 \times 3 = 12 \\
4 \times 3 = 12 \\
\hline
9 \times 3 = 92 \\
92 \\
\hline
\end{array}$

Short way:

$\begin{array}{c}
2 & 3 \\
\times & 4 \\
\hline
2 & 3 \\
9 & 2 \\
\hline
\end{array}$

align the numbers on the right-hand side

carry 10 ones to the tens column; keep 2 ones in the ones column

carried over from the ones column

$4 \times 23 = 92$

Multiply the long way.

1. $\begin{array}{c}
1 & 2 \\
\times & 4 \\
\hline
\end{array}$

$\begin{array}{c}
4 \times 2 \\
4 \times 10 \\
\hline
\end{array}$

2. $\begin{array}{c}
2 & 4 \\
\times & 3 \\
\hline
\end{array}$

$\begin{array}{c}
\end{array}$

3. $\begin{array}{c}
3 & 2 \\
\times & 4 \\
\hline
\end{array}$

$\begin{array}{c}
\end{array}$

4. $\begin{array}{c}
1 & 9 \\
\times & 5 \\
\hline
\end{array}$

$\begin{array}{c}
\end{array}$

5. $\begin{array}{c}
3 & 1 \\
\times & 6 \\
\hline
\end{array}$

$\begin{array}{c}
\end{array}$

6. $\begin{array}{c}
4 & 7 \\
\times & 6 \\
\hline
\end{array}$

$\begin{array}{c}
\end{array}$

Hints:

- To do vertical multiplication the short way:
  Align all the numbers on the right-hand side.
  Multiply the ones first.
  Then multiply the tens.
  Remember to carry 10 ones to 1 ten in the tens column.
  Remember to add the tens carried over from the ones column after multiplying the tens digit.
Ray bought 7 packs of juice boxes for the class picnic. There were 24 juice boxes in a pack. How many juice boxes did Ray buy?

BASICS BOX:
There are many methods for multiplying numbers with more than one digit. Here are two that Ray (and you) can use:

Traditional

<table>
<thead>
<tr>
<th>24</th>
<th>x 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>168</td>
<td></td>
</tr>
</tbody>
</table>

Multiply ones

<table>
<thead>
<tr>
<th>24</th>
<th>x 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

Regroup 2 tens

<table>
<thead>
<tr>
<th>24</th>
<th>x 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>168</td>
<td></td>
</tr>
</tbody>
</table>

Multiply tens

<table>
<thead>
<tr>
<th>24</th>
<th>x 7</th>
</tr>
</thead>
<tbody>
<tr>
<td>168</td>
<td></td>
</tr>
</tbody>
</table>

PRACTICE
Solve each problem using both methods. Show your work.

1. \[ \begin{array}{c}
36 \\
\times 8
\end{array} \]

\[ \begin{array}{c}
24 \\
\times 7
\end{array} \]

Partial Products

<table>
<thead>
<tr>
<th>30 + 6</th>
</tr>
</thead>
<tbody>
<tr>
<td>x 8</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>4</td>
</tr>
<tr>
<td>x 7</td>
</tr>
<tr>
<td>28</td>
</tr>
</tbody>
</table>

Multiply ones

\[ \begin{array}{c}
30 \\
\times 8
\end{array} \]

\[ \begin{array}{c}
6  \\
\times 8
\end{array} \]

Multiply tens

\[ \begin{array}{c}
20 \\
\times 7
\end{array} \]

\[ \begin{array}{c}
140
\end{array} \]

Add both products

<table>
<thead>
<tr>
<th>140</th>
</tr>
</thead>
<tbody>
<tr>
<td>+ 28</td>
</tr>
</tbody>
</table>

168 juice boxes

2. \[ \begin{array}{c}
52 \\
\times 9
\end{array} \]

JOURNAL

Which multiplication method do you find easiest to work with? Why?
Multiplication Methods

Find the products. Show your work.

1. \[ \begin{array}{c}
    13 \\
    \times 4
\end{array} \]

5. \[ \begin{array}{c}
    93 \\
    \times 5
\end{array} \]

2. \[ \begin{array}{c}
    25 \\
    \times 3
\end{array} \]

6. \[ \begin{array}{c}
    41 \\
    \times 8
\end{array} \]

3. \[ \begin{array}{c}
    50 \\
    \times 7
\end{array} \]

7. \[ \begin{array}{c}
    33 \\
    \times 3
\end{array} \]

4. \[ \begin{array}{c}
    68 \\
    \times 6
\end{array} \]

8. \[ \begin{array}{c}
    76 \\
    \times 2
\end{array} \]

Review.

9. \[ 30 \times 50 = \]

11. \[ 40 \times 80 = \]

10. \[ 300 \times 50 = \]

12. \[ 400 \times 800 = \]
1-Digit x 2-Digit Multiplication

Multiplication: One-Digit Numbers Times Two-Digit Numbers

Follow the steps for multiplying a one-digit number by a two-digit number using regrouping.

Example: Step 1: Multiply the ones. \[ \frac{2}{5} \times \frac{4}{7} \]
Regroup. \[ \frac{8}{8} \]
Step 2: Multiply the tens. \[ \frac{2}{5} \times \frac{4}{7} \]
Add two tens. \[ \frac{378}{378} \]

Directions: Multiply.

\[
\begin{align*}
27 & \times 3 & 63 & \times 4 & 52 & \times 5 & 91 & \times 9 & 45 & \times 7 & 75 & \times 2 \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
64 & \times 5 & 76 & \times 3 & 93 & \times 6 & 87 & \times 4 & 66 & \times 7 & 38 & \times 2 \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
47 & \times 8 & 64 & \times 9 & 51 & \times 8 & 99 & \times 3 \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
13 & \times 7 & 32 & \times 4 & 25 & \times 8 & 15 & \times 7 \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\
& & & & & & & & & & & \\

The chickens on the Smith farm produce 48 dozen eggs each day. How many dozen eggs do they produce in 7 days? 

\[ \underline{ } \]
Multiplication

43

When you multiply large numbers by a 1-digit number, multiply each digit of the top number by the bottom number, starting with the ones place. Regroup if the product is 10 or above.

Solve.

1)  
   45 \times 3  
   \underline{135}  
   36 \times 5  
   \underline{180}  
   15 \times 7  
   \underline{105}  
   40 \times 8  
   \underline{320}  
   73 \times 2  
   \underline{146}  
   84 \times 1  
   \underline{84}  

2)  
   19 \times 3  
   \underline{57}  
   36 \times 8  
   \underline{288}  
   47 \times 2  
   \underline{94}  
   152 \times 9  
   \underline{1368}  
   261 \times 8  
   \underline{2088}  
   350 \times 2  
   \underline{700}  

3)  
   428 \times 2  
   \underline{856}  
   579 \times 3  
   \underline{1737}  
   920 \times 5  
   \underline{4600}  
   327 \times 7  
   \underline{2289}  
   206 \times 3  
   \underline{618}  
   713 \times 6  
   \underline{4278}  

4)  
   179 \times 4  
   \underline{716}  
   803 \times 1  
   \underline{803}  
   263 \times 3  
   \underline{789}  
   3917 \times 5  
   \underline{19585}  
   5782 \times 6  
   \underline{34692}  
   1429 \times 5  
   \underline{7145}  

5) At Pancho’s Restaurant, 310 burritos are sold each year. Pancho’s has been open for 5 years. How many burritos have been sold since Pancho’s opened?  
   \[ \text{310} \times 5 \]

6) Plane tickets from Miami, Florida, to Denver, Colorado, cost $522 each. The 4 members of the Wilson family are buying tickets from Miami to Denver. How much will the tickets cost?  
   \[ \text{4 \times 522} \]

7) Megan bought 5 large bags of peanuts. There are 210 peanuts in each bag. How many peanuts does she have in all?  
   \[ \text{5 \times 210} \]
9.5 Estimating Products Page 1

Student Book pages 322–324

GOAL
Develop strategies for estimating.

Problem
8 soccer teams were playing in a tournament.
There were 9 players on each team.

About how many players were playing in the tournament?

There are different strategies for estimating.

Practise using easier numbers.
There are 8 teams with 9 players.
You are trying to estimate $8 \times 9$.

Think about easier numbers to use.
9 is close to 10.
Think about $8 \times 10$.
You can count by 10s.
$8 \times 10 = \underline{80}$
Since you changed 9 to 10, there are a few less than \underline{_____} players altogether.

Try the strategy again.
What if there were 6 teams with 7 players on each team?
Think about easier numbers to use.
6 is close to 5.
Think about $5 \times 7$.
You can count by 5s.
$5 \times 7 = \underline{35}$
Since you changed the 6 to 5, there are a few more than \underline{_____} players altogether.
9.5 Estimating Products

Use easier numbers to estimate the products.

$7 \times 9 =$ ______
Change the fact to $7 \times 10 =$ ______.
$7 \times 9$ is a little less than ______.

$8 \times 6 =$ ______
Change the fact to ______ $\times$ ______ = ______.
$8 \times 6$ is __________________________.

$11 \times 4 =$ ______
Change the fact to ______ $\times$ ______ = ______.
$11 \times 4$ is __________________________.

$9 \times 6 =$ ______
Change the fact to ______ $\times$ ______ = ______.
$9 \times 6$ is __________________________.

Reflecting

Was there another way you could have changed $9 \times 6$? Explain.
9.5 Estimating Products Page 1

Student Book pages 322–324

GOAL
Choose when and how to estimate.

Checking

1. Natasha’s school has 2 Grade 5 teams.
   Each team has 31 players.
   Estimate to answer the following question:
   Are there more than 50 Grade 5 players?

   I can use a number close to 31, such as 30.
   30 + 30 is the same as 30 × ________.
   I can multiply ________ × ________ to get an estimate.

2. How would you estimate each product?

   a) 9 × 48
      Circle the number closest to 48. 40 50
      I would estimate by multiplying 9 × ________.

      Explain another way you would estimate 9 × 48.
      ____________________________________________

   b) 4 × 355
      Circle the number closest to 355. 350 360
      I would estimate by multiplying ________ × ________.

      Explain another way you would estimate 4 × 355.
      ____________________________________________
Practising

6. Decide whether you can estimate to answer or if you need to calculate the exact answer. Then answer.

a) 1 CD can hold 72 minutes of music.
   Are 7 CDs enough to burn 500 minutes of music?
   I will have to burn my CDs all over again if my estimate is off,
   so I will ____________.
   $7 \times 70 = \underline{\hspace{2cm}}$
   $7 \times 2 = \underline{\hspace{2cm}}$
   $7 \times 72 = \underline{\hspace{2cm}} \text{ minutes}$
   7 CDs ______________ enough.

b) There are 3 plates with 76 dumplings on each plate.
   Are there at least 200 dumplings?
   I don’t need to know the ____________ number, so I will ____________.
   76 is close to ________, so $3 \times \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$.
   There are _______ 200 dumplings.

c) Jonah has $287 in his bank account.
   His brother saved 3 times as much money.
   Did his brother save at least $900?
   I will ____________ because ____________ ________ $\times 3 = \underline{\hspace{2cm}}$.
   Jonah’s brother ________________ save at least $900 because ____________
Estimating Products

**GOAL:**
Choose when and how to estimate.

1. Estimate each product. Show your work.
   
   a) $5 \times 44$
   
   b) $8 \times 62$
   
   c) $9 \times 28$
   
   d) $7 \times 31$
   
   e) $3 \times 82$
   
   f) $4 \times 73$

2. Decide whether you can estimate to answer. Then answer.
   
   a) Lang, Ken, and Joshua each have $42. Do they have enough money to buy a second-hand bike for $150?

   b) Each bookcase contains 64 books. There are 4 bookcases. Are there more than 200 books?

   c) 5 cartons hold 54 juice boxes each. Are there enough juice boxes for 250 students?
Estimating Products

Estimate the product of 51 and 62.

Round each number to the nearest 10.  Multiply.

\[ 62 \rightarrow 60 \quad 60 \]
\[ \times 51 \rightarrow 50 \quad \times 50 \]
\[ \underline{3000} \]

The estimated product is 3000.

Estimate by rounding to the nearest 10.

1. \[ 78 \rightarrow \quad 2. \quad 42 \rightarrow \quad 3. \quad 17 \rightarrow \]
\[ \times 57 \rightarrow x \quad \times 28 \rightarrow x \quad \times 47 \rightarrow x \]

4. \[ 24 \rightarrow \quad 5. \quad 33 \rightarrow \quad 6. \quad 18 \rightarrow \]
\[ \times 68 \rightarrow x \quad \times 52 \rightarrow x \quad \times 74 \rightarrow x \]

7. \[ 77 \quad 8. \quad 63 \quad 9. \quad 51 \]
\[ \times 64 \times \quad \times 32 \times \quad \times 37 \times \]

10. \[ 59 \quad 11. \quad 42 \quad 12. \quad 53 \]
\[ \times 68 \times \quad \times 39 \times \quad \times 47 \times \]

13. \[ 59 \quad 14. \quad 67 \quad 15. \quad 31 \]
\[ \times 48 \times \quad \times 17 \times \quad \times 84 \times \]
GOAL

Explain your thinking when solving a problem.

Checking

1. For every year a bear lives, it ages about 4 human years. Carolyn calculated the age of a 19-year-old bear in human years.

   1. I made sure I understood the problem.

   A bear this old... | ...is like a human this old
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
</tr>
</tbody>
</table>

   2. I made a plan. I calculated 19 x 4.

   3. I carried out the plan. 19 x 4 = 76.

   4. I looked back to check. 76 looks right because 20 x 4 = 80, so 19 x 4 must be less.

   a) What did Carolyn explain well?

      Be specific about each step she did.

      Hint: Look at Desmond's comments in the Student Book.

__________________________
__________________________
__________________________

   b) What questions would you ask Carolyn to improve her communication?

      For example: How did you know 19 x 4 = 76?
Practising

2. For every year a dog lives, it ages about 7 human years.
   How old is a 13-year-old dog in human years?

Step 1: Understand the Problem
I know a 1-year-old dog is _______ in human years.
I have to find out how old a _______ -year-old dog is in human years.
I can make a table to show what I know.

<table>
<thead>
<tr>
<th>A dog this old...</th>
<th>_______ is like a human this old</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
</tr>
</tbody>
</table>

Step 2: Make a Plan
I plan to ____________________________

Step 3: Carry Out the Plan
This is how I calculated the answer.

I found out ____________________________

Step 4: Look Back
I know my answer is reasonable because ____________________________
Problem
Horses age more quickly than humans.
For every year a horse lives, it ages 3 human years.
Ken wondered how old his 8-year-old horse would be in human years.

How can Ken explain how he solved the problem?

Understand the Problem
What do you know?

<table>
<thead>
<tr>
<th>A horse this old...</th>
<th>...is like a human this old</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td></td>
</tr>
</tbody>
</table>

Make a Plan
Multiply to find the answer.
How do you know that you can multiply?
9.6 Communicating about Solving Problems Page 2

Carry Out the Plan
What is the age of the horse?

Look Back to Check
Is your answer reasonable?

Reflecting
How could Ken have explained his plan more clearly?

Look at the Communication Checklist.
Do you think you have given a good explanation to how you solved the horse problem?
Why or why not?
9.6 Communicating about Solving Problems Page 1

Student Book pages 328–329

GOAL
Explain your thinking when solving a problem.

Checking

1. For every year a bear lives, it ages about 4 human years. Carolyn calculated the age of a 19-year-old bear in human years.

   1. I made sure I understood the problem.

   A bear this old... | ...is like a human this old
   --- | ---
   1 | 4
   2 | 8
   3 | 12

   2. I made a plan. I calculated $19 \times 4$.

   3. I carried out the plan. $19 \times 4 = 76$.

   4. I looked back to check. 76 looks right because $20 \times 4 = 80$, so $19 \times 4$ must be less.

a) What did Carolyn explain well?

   Be specific about each step she did.

   Hint: Look at Desmond's comments in the Student Book.

b) What questions would you ask Carolyn to improve her communication?

   For example: How did you know $19 \times 4 = 76$?

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________

__________________________________________________________
Practising

2. For every year a dog lives, it ages about 7 human years.
   How old is a 13-year-old dog in human years?

Step 1: Understand the Problem
I know a 1-year-old dog is ________ in human years.
I have to find out how old a ________-year-old dog is in human years.
I can make a table to show what I know.

<table>
<thead>
<tr>
<th>A dog this old...</th>
<th>....is like a human this old</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>14</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
</tr>
</tbody>
</table>

Step 2: Make a Plan
I plan to ____________________________

Step 3: Carry Out the Plan
This is how I calculated the answer.

I found out ____________________________

Step 4: Look Back
I know my answer is reasonable because ____________________________
Communicating about Solving Problems

GOAL

Explain your thinking when solving a problem.

1. Emily earns $28 each week for doing yard work. How much money can she earn in 5 weeks?

2. Jade, Cole, Michael, and Hailey each brought 46 brownies to the school bake sale. How many brownies did they bring in total?

3. Ken earned 72 points on the first day of the summer fair. If he earns the same number of points each day for 3 days will he win the prize for 290 points? Explain your solution.
<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
</table>

This table is meant to help illustrate place values in numbers, with each column representing a different place value.
9.7 Multiplying 2-Digit Numbers

Student Book pages 330–332

**GOAL**

Multiply 2-digit numbers by 1-digit numbers using expanded form.

**Problem**

Diane lives near a beach.

She collected 14 shells in 1 week.

She wants to collect the same number of shells each week.

How many shells will Diane have in 4 weeks?

There are 4 groups of 14 shells after 4 weeks.

When there are equal groups, you can multiply.

**Step 1:** Estimate first.

$4 \times 14$ is about $4 \times 10 = \underline{\phantom{10}}$.

I predict that Diane will have more than $\underline{\phantom{10}}$ shells.

**Step 2:** Make 4 groups of 14 with base ten blocks.

Record them using the expanded form.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$\underline{\phantom{10}}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\underline{\phantom{10}}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\underline{\phantom{10}}$</td>
</tr>
<tr>
<td></td>
<td></td>
<td>$\underline{\phantom{10}}$</td>
</tr>
</tbody>
</table>

$14 \times 4 \quad 10 + 4 \times 4$
9.7 Multiplying 2-Digit Numbers Page 2

Step 3: Multiply to show the number of tens first.

\[
\begin{array}{cccc}
14 & 10 + 4 \\
\times 4 & \times 4 \\
\hline
40 \text{ (number of tens)} \\
+ & \\
\hline
\end{array}
\]

Step 4: Complete the multiplication.

\[
\begin{array}{cccc}
14 & 10 + 4 \\
\times 4 & \times 4 \\
\hline
40 \text{ (number of tens)} \\
+ \text{ (number of ones)} \\
\hline
\text{ (total)}
\end{array}
\]

Diane will have _______ shells in 4 weeks.

Reflecting

Suppose that you multiplied the ones first. Would the product be the same? Explain.

_________________________

_________________________

_________________________

_________________________
GOAL
Multiply 3-digit numbers by 1-digit numbers using expanded form.

Checking


a) \(300 + 20 + 7\) is the same as \(327\)
\[
\times \quad 5 \quad \quad \quad \quad \quad \quad \times \quad 5
\]
Make 5 groups of _______ with base ten blocks.
Do not regroup.
Fill in the rest of the question.
\(300 + 20 + 7\)
\[
\times \quad 5
\]
1500 (number of hundreds)
100 (number of tens)
+ (number of ones)
(total altogether)

b) Model 5 groups of 327 with base ten blocks.
Remember, do not regroup.
\(327\)
\[
\times \quad 5
\]
35 (number of ones)
(number of tens)
+ (number of hundreds)
(total altogether)
9.7 Multiplying 3-Digit Numbers

Practising

7. Estimate, then calculate.

a) \(3 \times 986\)

986 is close to 1000 so I can estimate by multiplying \(3 \times \square = \square\).

\[
\begin{array}{c}
986 \\
\times 3 \\
\end{array}
\]

(number of hundreds)

(number of tens)

(number of ones)

(total altogether)

b) \(5 \times 181\)

181 is close to 200 so I can estimate by multiplying \(5 \times \square = \square\).

\[
\begin{array}{c}
181 \\
\times 5 \\
\end{array}
\]

+ 

c) \(7 \times 332\)

332 is close to 300 so I can estimate by multiplying \(7 \times \square = \square\).

\[
\begin{array}{c}
332 \\
\times 7 \\
\end{array}
\]

+ 

5. Calculate. Follow Diane’s Solution from Student Book page 330.

a) 361 300 + 60 + 1
   \[ \times 7 \quad \times 7 \]
   \[ \quad + \quad \quad + \quad \]

b) 421 400 + 20 + 1
   \[ \times 4 \quad \times 4 \]
   \[ + \quad + \]

c) 618 600 + 10 + 8
   \[ \times 3 \quad \times 3 \]
   \[ + \quad + \]

d) 333 300 + 30 + 3
   \[ \times 6 \quad \times 6 \]
   \[ + \quad + \]
Multiplying 3-Digit Numbers

GOAL
Multiply 3-digit numbers by 1-digit numbers using expanded form.

1. Multiply.
   a) \(3 \times 242 = \_\) 
   \[200 + 40 + 2\] 
   \[\times 3\] 
   b) \(2 \times 567 = \_\) 
   \[500 + 60 + 7\] 
   \[\times 2\]

2. Multiply.
   a) \(2 \times 122\) 
   c) \(3 \times 254\) 
   e) \(4 \times 197\) 
   b) \(5 \times 316\) 
   d) \(6 \times 624\) 
   f) \(2 \times 472\)

   

   

   

   

   

3. Estimate to check your answer for each part of Question 2.
   a) 
   c) 
   e) 
   b) 
   d) 
   f)
9.8 Multiplying Another Way Page 1

Student Book pages 334–337

GOAL
Multiply, regrouping as you go.

Problem
Michael has 56 hockey cards. Pedro has twice as many.

How many cards does Pedro have?
Twice as many means 2 times as many.
Multiply 56 cards by 2.

Step 1: Estimate $2 \times 56$ first.
I know that $2 \times 50 = \underline{100}$.
So Pedro has more than $\underline{100}$ cards.

Step 2: Multiply by making 2 groups of 56.
Use base 10 blocks.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$2 \times 56 = \underline{112}$

Step 3: There are $2 \times 6$ ones.
$2 \times 6 = 12$
Regroup 12 ones as 1 ten, 2 ones.

<table>
<thead>
<tr>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$2 \times 56 = \underline{112}$

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9.8 Multiplying Another Way Page 2

Step 4: There are $2 \times 5$ tens + 1 ten.
There are 11 tens.
Regroup 11 tens as 1 hundred, 1 ten.

\[
\begin{array}{c|c|c}
\text{Hundreds} & \text{Tens} & \text{Ones} \\
\hline
& & \\
\end{array}
\]

\[
2 \times 56 = __
\]

\[
\begin{array}{c}
1 \\
5 \\
6 \\
\times \\
2 \\
\hline
1 \\
2
\end{array}
\]

Step 5: Add.
100 + 10 + 2 = 

2 × 56 = 

So, Pedro has _______ cards.

Reflecting

How did using the place value chart help you to multiply 2-digit numbers?

________________________________________________________________________
________________________________________________________________________
________________________________________________________________________
________________________________________________________________________

________________________________________________________________________
9.8 Multiplying Another Way Page 1

Student Book pages 334–337

GOAL
Multiply, regrouping as you go.

Checking

1. Follow these steps to calculate.

a) \(7 \times 62\)

Step 1: Multiply by making 7 groups of 62 using base ten blocks.
Sketch the groups on a place value chart.
How many ones? _______
Regroup the ones as _______ tens _______ ones.
How many tens? _______
Regroup the tens as _______ hundreds _______ tens.
How many hundreds? _______

Step 2: Count all the blocks together.
There are _______ hundreds _______ tens _______ ones.
\(7 \times 62 = _______\)

b) \(7 \times 145\)

Step 1: Multiply by making 7 groups of 145 using base ten blocks.
Sketch the groups on a place value chart.
How many ones? _______
Regroup the ones as _______ tens _______ ones.
How many tens? _______
Regroup the tens as _______ hundreds _______ tens.
How many hundreds? _______
Regroup the hundreds as _______ thousand _______ hundreds.
Step 2: Count all the blocks together.
There are _______ thousands _______ hundreds _______ tens _______ ones.
$7 \times 145 = \underline{\hspace{2cm}}$

Practising

5. Write the multiplication equation for this model.

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Circle) the groups.
How many are there? _______
How much do the blocks in 1 group equal? _______
Use your answers to write the multiplication equation.

$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}}$

Count the blocks.
Regroup if you need to.
There are _______ thousands _______ hundreds _______ tens _______ ones.
The product is _______.
Scaffolding for Lesson 8, Question 7


a) 

\[
\begin{array}{c}
3 & 0 & 5 \\
\times & 4 \\
\end{array}
\]

- Step 1  Estimate $4 \times 305$ is about $4 \times ____$.
- Step 2  Multiply by making ____ groups of ____.

Sketch the groups on a place value chart.

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
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- Step 3  Multiply the ones. Regroup if you need to.
- Step 4  Multiply the tens. Regroup if you need to.
- Step 5  Multiply the hundreds. Regroup if you need to.

b) 

\[
\begin{array}{c}
2 & 6 & 0 \\
\times & 5 \\
\end{array}
\]

c) 

\[
\begin{array}{c}
2 & 9 & 3 \\
\times & 6 \\
\end{array}
\]

d) 

\[
\begin{array}{c}
4 & 2 & 9 \\
\times & 4 \\
\end{array}
\]
Multiplying Another Way

GOAL
Multiply, regrouping as you go.

1. Multiply by regrouping.
   a) \[ 4 \ 3 \times 5 \]
   b) \[ 1 \ 5 \ 2 \times 4 \]
   c) \[ 4 \ 6 \ 1 \times 6 \]
   d) \[ 2 \ 4 \ 3 \times 5 \]
   e) \[ 5 \ 4 \ 8 \times 2 \]
   f) \[ 6 \ 1 \ 7 \times 7 \]
   g) \[ 4 \ 9 \ 2 \times 3 \]
   h) \[ 1 \ 2 \ 9 \times 5 \]
   i) \[ 2 \ 5 \ 7 \times 2 \]

At-Home Help
You can multiply by regrouping. For example:
I want to know \( 3 \times 384 \). As I multiply, I will regroup ones, tens, and hundreds.
\[ \begin{align*}
   &3 \ 1 \\
   \times &3 \ 8 \ 4 \\
   \hline
   &1 \ 1 \ 5 \ 2 \\
\end{align*} \]
\[ 3 \times 384 = 1152 \]

2. a) What multiplication equation does this model show?

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
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</tbody>
</table>

b) Calculate the product.
Scaffolding for Lesson 8, Question 7


a) 

\[
\begin{array}{c}
3.05 \\
\times 
\end{array}
\]

- Step 1  Estimate \(4 \times 305\) is about \(4 \times 300 = 1200\)

- Step 2  Multiply by making \(4\) groups of \(300\).

Sketch the groups on a place value chart.

<table>
<thead>
<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
</tr>
</thead>
<tbody>
<tr>
<td>[\text{\includegraphics{chart}}]</td>
<td></td>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

\[
\begin{array}{c}
\times 4 \\
1220 \\
\end{array}
\]

- Step 3  Multiply the ones. Regroup if you need to.

- Step 4  Multiply the tens. Regroup if you need to.

- Step 5  Multiply the hundreds. Regroup if you need to.

b) 

\[
\begin{array}{c}
13 \\
2 \ 6 \ 0 \\
\times 5 \\
1300 \\
\end{array}
\]

c) 

\[
\begin{array}{c}
15 + 1 \\
293 \\
\times 6 \\
1758 \\
\end{array}
\]

d) 

\[
\begin{array}{c}
1 + 3 \\
429 \\
\times 4 \\
1716 \\
\end{array}
\]
Multiplying Another Way

1. Multiply by regrouping.
   a) \( \frac{43}{+1} \times 5 \)
   b) \( 152 \times 4 \)
   c) \( 461 \times 6 \)
   d) \( 243 \times 5 \)
   e) \( 548 \times 2 \)
   f) \( 617 \times 7 \)
   g) \( 492 \times 3 \)

2. a) What multiplication equation does this model show?
   
<table>
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<tr>
<th>Thousands</th>
<th>Hundreds</th>
<th>Tens</th>
<th>Ones</th>
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</table>

   b) Calculate the product.
Choose whether to estimate or calculate, and explain your multiplication method.

Problem
Sometimes you can find an answer using estimation.
Sometimes you can solve a problem using mental math.
Sometimes you need materials to solve a problem.

How can you solve each problem?

1. You and your friend are buying 2 bottles of water.
   1 bottle of water costs $1.25.
   You want to make sure you have enough money to buy 2 bottles.
   Would you estimate or calculate the cost of 2 bottles?
   Explain or show what you would do.

2. There are 45 pencils in a box.
   You want to know if there are more than 150 pencils in 3 boxes.
   Would you estimate or calculate the number of pencils?
   Explain or show what you would do.
3. 5 schools are getting together for a checkers tournament.
   Each school is bringing 100 students.
   How many students will be at the tournament altogether?
   Would you estimate or calculate the number of students?
   Explain or show what you would do.

4. The grocery store sells eggs in cartons of 12.
   If you buy 3 cartons of eggs, will you have more or less than 30 eggs?
   Would you estimate or calculate the number of eggs?
   Explain or show what you would do.

Reflecting

How did you decide when to use mental math?

How did you decide when to estimate?
9.9 Choosing a Method for Multiplying Page 1

Student Book pages 338–340

GOAL
Choose whether to estimate or calculate, and explain your multiplication method.

Checking

1. In 2004:
   - 33 babies were born in Saskatchewan every 24 hours
   - 44 babies were born in Alberta every 10 hours

   Would you estimate or calculate to find the following answers? Why?

   a) How many Saskatchewan babies were born in 5 days?
      I need to find out the exact answer so I would ____________________.

   b) Were more than 1000 babies born in Alberta each month?
      I would ____________________ because ____________________

2. How would you calculate in each situation?
   Hint: Choose mental math, expanded form, or base ten blocks.

   a) the number of Saskatchewan babies born in 6 days
      1 day = 33 babies, so 6 days = ________ × ________
      I would ____________________

   b) the number of Alberta babies born in 90 hours
      10 hours = 44 babies, so 90 hours = ________ × ________
      I would ____________________
9.9 Choosing a Method for Multiplying Page 2

Practising

3. Would you answer each question using mental math or base ten blocks?

a) There are 250 sheets in 1 pack of paper.

Are there more than 500 sheets in 3 packs?

1 pack = 250

3 packs = ________ × 250

I would __________________ because ____________________________

b) How many days are there in 2 years?

1 year = 365 days

2 years = ________ × 365

I would __________________ because ____________________________

c) Aaron has 3 times as much money as Raven. Raven has $127.

Raven = $127

Aaron = ________ × 127

I would __________________ because ____________________________

6. Alana earns $9 an hour babysitting. Which could you answer by estimating?

A: the amount Alana earns in 10 hours

B: the amount Alana earns in 15 hours

C: the number of hours needed to earn $90

D: about how long it would take Alana to earn $250

I could estimate letter _______ because ____________________________.
Chapter 9
Lesson 9

Choosing a Method for Multiplying

GOAL

Choose whether to estimate or calculate, and explain your multiplication method.

1. Jade can string 76 beads every hour. Which question could you answer by estimating?
   A. How many beads can Jade string in 10 hours?
   B. How many beads can Jade string in 12 hours?
   C. Would Jade use more than 200 beads in 3 hours?
   D. How many hours would it take for Jade to use 380 beads?

   At-Home Help
   Here are 3 methods you can use to solve multiplication problems:
   - estimate
   - calculate using mental math
   - calculate using materials

2. How would you answer each question: by estimating, using mental math, or using base ten blocks?
   a) A skateboard costs $325. Can you buy 2 skateboards for $600?
      estimating
   b) Joshua earned 279 points at the school fair. Diane earned 3 times as many points. How many points did Diane earn?
      base 10 blocks
   c) Aneela can type 42 words in a minute. How many words can she type in 5 minutes?
      mental math

3. Matt and Hailey want to solve this problem:
   A box of crayons holds 54 crayons. About how many crayons are in 9 boxes?
   Matt says, “I will use mental math to solve the problem.
   \[ 9 \times 50 = 450, \text{ and } 9 \times 4 = 36. \text{ The answer is } 450 + 36 = 486. \]”
   Hailey says, “I will estimate to solve the problem. 9 is close to 10.
   \[ 10 \times 54 = 540, \text{ so the answer is about } 540. \]”
   Can both answers be correct? Explain your answer. Yes, I think both answers can be right because one is an approximate or estimate and the other is an exact calculation.
Solve the problems. Show your work.

1. A bag of potato chips weighs 225 g. What is the total weight of 4 bags of potato chips?

   The total weight of 4 bags of potato chips is 900.

2. A box of sugar contains 125 packets. How many packets are there in 6 boxes?

   750 in each

3. The capacity of one can of pop is 355 mL. How many mL of pop are there in 6 cans?

   2130 mL

4. Ted drinks 1 box of juice each day. If the capacity of a box of juice is 250 mL, how many mL of juice does Ted drink in one week?

   1750 in one week

---

**Just For Fun**

Solve the problem.

Write 2 to 11 in the circles so that the sum of the numbers at the centre and the 4 corners of each rectangle is 27.
9.10 Creating Multiplication Problems
Student Book page 341

GOAL
Create and solve multiplication problems.

How can you create a story about multiplication?

Step 1: Understand the Problem
What do you have to do?

Step 2: Make a Plan
What is your story going to be about?

What kinds of multiplication problems will be in the story?

What strategies will you use to find the answer to these multiplication problems?

Step 3: Carry Out the Plan
Write the pages of your story. Show how you solved the multiplication problems.

Step 4: Look Back
How do you know you made multiplication problems in your book?
9.10 Creating Multiplication Problems
Student Book page 341

GOAL
Create and solve multiplication problems.

Problem
Alec wrote a page for a book about multiplication.
He included a picture and a multiplication story.
He also wrote a multiplication fact.
His story told the answer to the problem.

How can you create a story about multiplication?

Hint: First think of equal groups of things for a story.
Write the multiplication fact that goes with your story.
Write your story.
End your story with the answer to the multiplication problem.
GOAL
Create and solve multiplication problems.

How can you create a story about multiplication?

Step 1: Understand the Problem
What do you have to do?

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What is your story going to be about?

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9.10 Creating Multiplication Problems
Student Book page 341

GOAL
Create and solve multiplication problems.

Problem
Alec wrote a page for a book about multiplication.
He included a picture and a multiplication story.
He also wrote a multiplication fact.
His story told the answer to the problem.

How can you create a story about multiplication?

Hint: First think of equal groups of things for a story.
Write the multiplication fact that goes with your story.
Write your story.
End your story with the answer to the multiplication problem.
Chapter 9
Lesson 10

Creating Multiplication Problems

GOAL
Create and solve multiplication problems.

1. Fill in the blanks to write your own multiplication problems.
   a) _____ × 26
      Diane made 26 cookies every day. How many cookies did she make in _____ days?
      Diane made ______ cookies.
   b) 3 × ______
      Ken earns $_______ every week. How much does he earn in 3 weeks?
      Ken earns $_______ in 3 weeks.
   c) ______ × ______
      Jade made ______ necklaces with ______ beads in each necklace. How many beads did Jade use?
      Jade used ______ beads.

2. Write a multiplication problem that uses the numbers 4 and 213. Solve your problem.

At-Home Help
Follow these steps to create your own multiplication problem.
Step 1 Think of 2 numbers to multiply (e.g., 125 × 4).
Step 2 Write a problem using your 2 numbers (e.g., There are 125 raisins in a bag. How many raisins are in 4 bags?).
Step 3 Solve your problem (e.g., 500 raisins are in 4 bags).
Chapter 9  Test Yourself

Circle the correct answer.

1. What is the product? $5 \times 300 = \underline{\hspace{1cm}}$
   
   A. 1100  
   B. 1200  
   C. 1500  
   D. 1800

2. Which number sentence does this array show?
   
   A. $6 \times 10 = 60$
   
   B. $6 \times 17 = 6 \times 10 + 6 \times 7$
   
   C. $7 \times 12 = 7 \times 10 + 7 \times 2$
   
   D. $10 \times 60 = 600$

3. What is the expanded form of 853?
   
   A. $800 + 50 + 3$  
   B. $85 + 30$  
   C. $8 + 5 + 3$  
   D. $8 \times 5 \times 3$

4. Matt made 6 models. Each model used 29 small sticks. About how many small sticks did Matt use?
   
   A. 220  
   B. 180  
   C. 120  
   D. 300

5. Jade used 521 beads for each of 4 necklaces. How many beads did she use?
   
   A. 2840  
   B. 2804  
   C. 2484  
   D. 2084

6. Which multiplication equation does this model show?
   
   A. $3 \times 236$
   
   B. $3 \times 136$
   
   C. $136 \times 2$
   
   D. $1 \times 266$
Chapter 9 Test  Page 1

1. What is the missing number?
   a) \(400 = \_ \times 100\)  
   b) \(\_ \times 70 = 490\)  
   c) \(\_ \times 500 = 1500\)

2. Mika multiplied using this array.

   ![Array Image]

   a) What multiplication does the array show?
   b) Split the array to show 2 smaller arrays. What is the multiplication sentence?
   c) Write the product. Calculate and show your work.

3. Patti’s hip hop class has 34 dancers. Each dancer sold 5 raffle tickets. How many raffle tickets did the dance class sell altogether? Show your work!

4. Would you estimate or calculate? Why?
   If you would estimate, explain how.
   a) One shelf holds 400 CDs. How many CDs are on 3 shelves?
   b) Jody is reading a book that has 108 pages. Dar is reading a book that has about 4 times as many pages. About how many pages does Dar’s book have?
5. Multiply. Explain your choice of method. (Show process/work)
   a) $6 \times 50$
   b) $7 \times 412$
   c) $8 \times 499$
   d) $3 \times 668$

6. Derek brushes his teeth 3 times a day. Use regrouping (old school) strategy to find how many times does he brush his teeth in 1 year.

7. Calculate. Use the expanded multiplication strategy.
   a) $4 \times 73$
   b) $5 \times 29$
   c) $7 \times 361$
   d) $8 \times 333$

8. A car is travelling 88 km in 1 hour. How far does the car travel in 8 hours? Show your work.

9. Ali is fencing off a square field for her goats. Each side of the field is 125 m long. What is the length of the fence? Use base ten blocks to solve.