Multiply Using Partial Products

Essential Question: How can you use place value and partial products to multiply by a 1-digit number?

Unlock the Problem

CONNECT How can you use what you know about the Distributive Property to break apart numbers to find products of 3-digit and 1-digit numbers?

Use place value and partial products.

Multiply. $6 \times 182$ Estimate. $6 \times 200 = \underline{\hspace{1.5cm}}$

**Math Talk**

Use Reasoning How can you use the Distributive Property to find $4 \times 257$?

**Mathematical Practices**

MP1, MP7

<table>
<thead>
<tr>
<th>STEP 1</th>
<th>SHADE THE MODEL</th>
<th>THINK AND RECORD</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>100 80 2</td>
<td>$182 \times 6$</td>
</tr>
<tr>
<td></td>
<td>$6 \times 100$</td>
<td>$6 \times 1 \text{ hundred} = 6 \text{ hundreds}$</td>
</tr>
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<td>6</td>
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<table>
<thead>
<tr>
<th>STEP 2</th>
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<tr>
<td></td>
<td>100 80 2</td>
<td>$182 \times 6$</td>
</tr>
<tr>
<td></td>
<td>$6 \times 80$</td>
<td>$6 \times 8 \text{ tens} = 48 \text{ tens}$</td>
</tr>
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<td>6</td>
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<thead>
<tr>
<th>STEP 3</th>
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<tbody>
<tr>
<td></td>
<td>100 80 2</td>
<td>$182 \times 6$</td>
</tr>
<tr>
<td></td>
<td>$6 \times 20$</td>
<td>$6 \times 2 \text{ ones} = 12 \text{ ones}$</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td></td>
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<table>
<thead>
<tr>
<th>STEP 4</th>
<th>SHADE THE MODEL</th>
<th>THINK AND RECORD</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>100 80 2</td>
<td>$182 \times 6$</td>
</tr>
<tr>
<td></td>
<td>$6 \times 2$</td>
<td>Add the partial products.</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>$600 + 480 + 12$</td>
</tr>
</tbody>
</table>

So, $6 \times 182 = 1,092$. Since 1,092 is close to the estimate of 1,200, it is reasonable.
Example

Use place value and partial products.

Multiply. $2 \times 4,572$

Estimate. $2 \times 5,000 = \underline{}$

$4,572 \times 2$

$\leftarrow 2 \times 4 \text{ thousands} = 8 \text{ thousands}$

$\leftarrow 2 \times 5 \text{ hundreds} = 1 \text{ thousand}$

$\leftarrow 2 \times 7 \text{ tens} = 1 \text{ hundred, 4 tens}$

$\leftarrow 2 \times 2 \text{ ones} = 4 \text{ ones}$

$\leftarrow \text{Add the partial products.}$

Share and Show

1. Use the model to find $2 \times 137$.

2. Estimate: \underline{}

3. Estimate: \underline{}

4. Estimate: \underline{}

Estimate. Then record the product.

Example

$← 2 \times 4 \text{ thousands} = 8 \text{ thousands}$

$← 2 \times 5 \text{ hundreds} = 1 \text{ thousand}$

$← 2 \times 7 \text{ tens} = 1 \text{ hundred, 4 tens}$

$← 2 \times 2 \text{ ones} = 4 \text{ ones}$

Math Talk

Explain how using place value and expanded form makes it easier to find products.
On Your Own

Estimate. Then record the product.

5. Estimate: 
   $53 \times 4$

6. Estimate: 
   $473 \times 9$

7. Estimate: 
   $608 \times 6$

Practice: Copy and Solve

Estimate. Then record the product.

8. $2 \times 78$

9. $2 \times $210

10. $9 \times $682

11. $8 \times 8,145$

Use Reasoning Algebra

Find the missing digit.

12. $5 \times 7 = 455$

13. $248 \times 3 = 44$

14. $\frac{\$395}{x} = $2,370

15. $3,748 \times 4 = 1 \underline{,992}$

16. A store bought 9 cases of light bulbs in May and 8 cases in June. There are 48 light bulbs in a case. How many light bulbs did the store buy in May and June?

17. Mr. Wilson saved $2,500 to buy airline tickets for his family. He bought 6 airline tickets for $372 each. How much of his savings does Mr. Wilson have after he buys the tickets?

18. Coach Ramirez bought 8 cases of bottled water for a road race. There are 24 bottles in each case. After the race, 34 bottles of water were left. How many bottles were used at the race? Explain.
19. **Use Diagrams** Look at the picture. Kylie has 832 songs on her portable media player. Lance has 3 times as many songs. How many fewer songs can Lance add to his player than Kylie can add to hers?

20. **Go Deeper** James wants to buy the new portable media player shown. He has 5 times as many songs as Susan. Susan has 1,146 songs. Will all of his songs fit on the portable media player? How many songs does James have?

21. **Think Smarter** The sum of a 3-digit number and a 1-digit number is 217. The product of the numbers is 642. If one number is between 200 and 225, what are the numbers?

22. **Think Smarter** Mrs. Jackson bought 6 gallons of juice for a party. Each gallon has 16 cups. After the party, 3 cups of juice were left over. At the party, how many cups did people drink? Show your work and explain how you found your answer.
Multiply Using Partial Products

Estimate. Then record the product.

1. Estimate: 1,200
   \[ \begin{array}{c}
   243 \\
   \times 6
   \end{array} \]
   \[ 1,200 \]
   \[ 240 \]
   \[ + 18 \]
   \[ 1,458 \]

2. Estimate: _____
   \[ \begin{array}{c}
   640 \\
   \times 3
   \end{array} \]

3. Estimate: _____
   \[ \begin{array}{c}
   \$149 \\
   \times 5
   \end{array} \]

4. Estimate: _____
   \[ \begin{array}{c}
   721 \\
   \times 8
   \end{array} \]

5. Estimate: _____
   \[ \begin{array}{c}
   293 \\
   \times 4
   \end{array} \]

6. Estimate: _____
   \[ \begin{array}{c}
   \$416 \\
   \times 6
   \end{array} \]

7. Estimate: _____
   \[ \begin{array}{c}
   961 \\
   \times 2
   \end{array} \]

8. Estimate: _____
   \[ \begin{array}{c}
   837 \\
   \times 9
   \end{array} \]

9. A maze at a county fair is made from 275 bales of hay. The maze at the state fair is made from 4 times as many bales of hay. How many bales of hay are used for the maze at the state fair?

   \[ \text{__________________________} \]

10. Pedro gets 8 hours of sleep each night. How many hours does Pedro sleep in a year with 365 days?

   \[ \text{__________________________} \]

11. **WRITE Math** Explain how you can find \( 4 \times 754 \) using two different methods.

   \[ \text{__________________________} \]
Lesson Check (4.NBT.B.5)

1. A passenger jet flies at an average speed of 548 miles per hour. At that speed, how many miles does the plane travel in 4 hours?

2. Use the model to find $3 \times 157$.

   
   
   
   

   

Spiral Review (4.NBT.A.2, 4.NBT.B.4, 4.NBT.B.5)

3. The school fun fair made $1,768 on games and $978 on food sales. How much money did the fun fair make on games and food sales?

4. Use the table below.

<table>
<thead>
<tr>
<th>State</th>
<th>Population</th>
</tr>
</thead>
<tbody>
<tr>
<td>North Dakota</td>
<td>646,844</td>
</tr>
<tr>
<td>Alaska</td>
<td>698,473</td>
</tr>
<tr>
<td>Vermont</td>
<td>621,760</td>
</tr>
</tbody>
</table>

   List the states from least to greatest population.

5. A National Park covers 218,375 acres. What is this number written in expanded form?

6. Last year a business had profits of $8,000. This year its profits are 5 times as great. What are this year’s profits?