

# Lesson 3.4/3.5

MULTIPLY

Use Area Models  
and Partial Products  
to Multiply



# STANDARD: NC.4.NBT.5

- Multiply a whole number of up to three digits by a one-digit whole number.
- Multiply up to two two-digit numbers with place value understanding using area models, partial products, and the properties of operations.
- Use models to make connections and develop the algorithm.

# Essential Question & I Can Statement

I can use area models and partial products to multiply.

How can you use an area model and partial products to multiply? Lesson 3.4

How can you multiply with greater numbers?  
Lesson 3.5

# Mathematics Objective:

MULTIPLY



Today we will continue to use place value and partial products to multiply 3-digit numbers by 1-digit numbers. We will also practice using area models.



# Vocabulary:

MULTIPLY



|          |                                                                      |
|----------|----------------------------------------------------------------------|
| multiply | the result of repeated additions of equal groups.                    |
| factor   | the numbers that are multiplied together to make a product.          |
| product  | the answer to a multiplication problem.                              |
| multiple | the product of a given number and any nonzero whole number (factor). |
| array    | A way of displaying objects in rows and columns.                     |

# Vocabulary:

MULTIPLY



|                      |                                                                                                                                                                 |
|----------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| numerical expression | an expression that contains numbers and at least one operation.                                                                                                 |
| equation             | <p>A number sentence that uses the equal sign (=) to show that two expressions have the same value.</p> <p>Example: <math>9 + 3 = 12</math></p>                 |
| area model           | a rectangle used to model multiplication and division of whole numbers.                                                                                         |
| partial product      | Products found by breaking one factor in a multiplication problem into ones, tens, hundreds, and so on, and then multiplying each of these by the other factor. |

# Vocabulary:

MULTIPLY



|                                         |                                                                                                                                                                                                                                         |
|-----------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| commutative property of multiplication  | factors can be multiplied in <u>any order</u> and the product stays the same.<br>Example: $3 \times 200$ or $200 \times 3$                                                                                                              |
| associative property of multiplication  | factors can be <u>regrouped</u> and the product stays the same.<br>Example: $3 \times (2 \times 100)$ or $(3 \times 2) \times 100$                                                                                                      |
| distributive property of multiplication | multiplying a sum (or difference) by a number is the same as multiplying each number in the sum (or difference) by that number and adding (or subtracting) the products.<br><br>Example: $(3 \times 21) = (3 \times 20) + (3 \times 1)$ |



# Solve-N-Share

The horseshoe pit has an area of 228 square feet. The length of one part of the pit was erased by mistake. What is the length of the missing section,  $x$ ? **Solve any way you choose.** Explain how you found the answer.





# REVIEW



Review!

Solve  $4 \times 162$  using the partial product method.

# Review: Partial Product!

## REVIEW



$$\begin{array}{r} 162 \\ \times 4 \\ \hline 8 \\ 240 \\ +400 \\ \hline 648 \end{array}$$

8 ← 4 × 2

240 ← 4 × 60

+400 ← 4 × 100

648



...can we  
talk?

There are 24 hours in a day. How many hours are in there in 7 days? Use the partial product strategy to find your product.



# Review: Partial Product!

REVIEW



$$\begin{array}{r} 24 \\ \times 7 \\ \hline 21 \\ + 140 \\ \hline 161 \end{array}$$

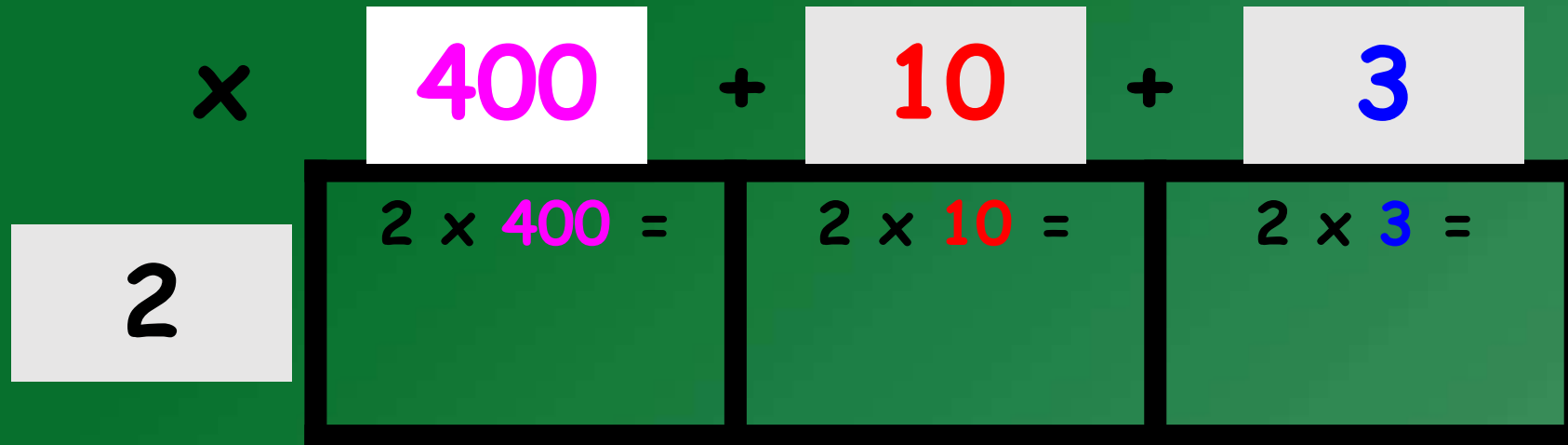
Diagram illustrating the Partial Product method for  $24 \times 7$ :

- The top part shows the multiplication  $24 \times 7$  with the result  $21$  (from  $4 \times 7$ ) and the next partial product  $140$  (from  $20 \times 7$ ).
- The bottom part shows the final sum  $161$ .
- Arrows indicate the breakdown of the partial products:  $21$  is derived from  $7 \times 4$ , and  $140$  is derived from  $7 \times 20$ .
- A box highlights the expression  $(20 + 4) \times 7$ , with arrows pointing to the  $20$  and  $4$  terms, and a curved arrow indicating the distribution of the  $7$  to both terms.

When using the area model, you need to think about the numbers in expanded form.

Take a look on the next slides for a step by step example!

This is an area model that was created for  $2 \times 313$ . What do you notice? Let's discuss as a class.



The diagram illustrates the area model for the multiplication  $2 \times 313$ . It is set against a green chalkboard background with a wooden frame. At the top, the equation  $2 \times 400 + 10 + 3$  is displayed, with the numbers 400, 10, and 3 highlighted in pink, red, and blue respectively. Below this, a large rectangle is divided into three vertical sections. To the left of these sections is a white box containing the number 2. Each of the three sections contains the expression  $2 \times$  followed by the corresponding number from the top row (400, 10, and 3) and an equals sign, all in the same color as the number they represent. The sections are currently empty, intended for students to draw area models for each partial product.

$$2 \times 400 + 10 + 3$$

|                  |                 |                |
|------------------|-----------------|----------------|
| $2 \times 400 =$ | $2 \times 10 =$ | $2 \times 3 =$ |
|------------------|-----------------|----------------|



This is the second step in multiplying  $2 \times 313$ . Let's multiply!!

|          |                  |                 |                |   |   |
|----------|------------------|-----------------|----------------|---|---|
| $\times$ | 400              | +               | 10             | + | 3 |
| 2        | $2 \times 400 =$ | $2 \times 10 =$ | $2 \times 3 =$ |   |   |

This is the last step in multiplying  $2 \times 313 = 423$ . What do you notice?  
How was the product determined?

$$\begin{array}{r} \times \quad 400 + 10 + 3 \\ 2 \end{array}$$

|                         |                       |                     |
|-------------------------|-----------------------|---------------------|
| $2 \times 400 =$<br>800 | $2 \times 10 =$<br>20 | $2 \times 3 =$<br>3 |
|-------------------------|-----------------------|---------------------|

$$+ \begin{array}{r} 400 \\ 20 \\ \underline{3} \\ 423 \end{array}$$

Try it out. The area model has been started for you. Multiply  $263 \times 3$   
or  $(200 + 60 + 3) \times 3$

TRY IT OUT



$\times$

200

+

60

+

3

3

|  |  |  |
|--|--|--|
|  |  |  |
|--|--|--|



Try it out. The area model has been started for you. Multiply  $263 \times 3$   
or  $(200 + 60 + 3) \times 3$

|          |                  |   |                 |   |                |
|----------|------------------|---|-----------------|---|----------------|
| $\times$ | 200              | + | 60              | + | 3              |
| 3        | $3 \times 200 =$ |   | $3 \times 60 =$ |   | $3 \times 3 =$ |

$$600 + 180 + 9 = 789$$

Try it out. The area model has been started for you. Multiply  $1,117 \times 5$   
or  $(1,000 + 100 + 10 + 7) \times 5$

$$\times \quad 1,000 + 100 + 10 + 7$$

5



Try it out. The area model has been started for you. Multiply  $1,117 \times 5$   
or  $(1,000 + 100 + 10 + 7) \times 3$

$$\times \quad 1,000 + 100 + 10 + 7$$

5

$$5 \times 1,000$$

$$5 \times 100 =$$

$$5 \times 10 =$$

$$5 \times 7 =$$

Try it out. The area model has been started for you. Multiply  $1,117 \times 5$   
or  $(1,000 + 100 + 10 + 7) \times 3$

$$\times \quad 1,000 + 100 + 10 + 7$$

5

$$5 \times 1,000$$

$$5 \times 100 =$$

$$5 \times 10 =$$

$$5 \times 7 =$$

$$5,000 + 500 + 50 + 35 = 5,585$$

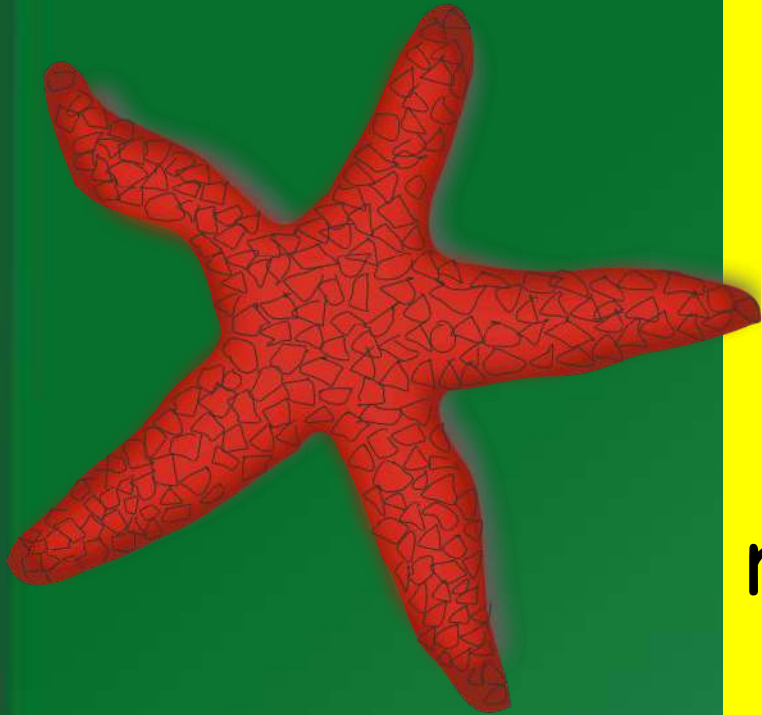


# Partial Product!



For math class Kisha's mom filled 4 pencil boxes with pencils. If each box held 329 pencils, how many pencils did she have for class? Use the partial product strategy to solve.

# Area Model!



Cahmad went to the aquarium and visited the starfish room. The room had 7 tanks and each tank contained 384 starfish. How many starfish did Cahmad count in the room? Use the area model strategy to solve.

# EXIT TICKET

Admit One

Explain the process of using partial products. What are the steps and how does it help you to find the product of two numbers?

Admit One

# Independent Practice

Admit One

Page 99 Problems 3-8. Use area model and partial products.

Admit One