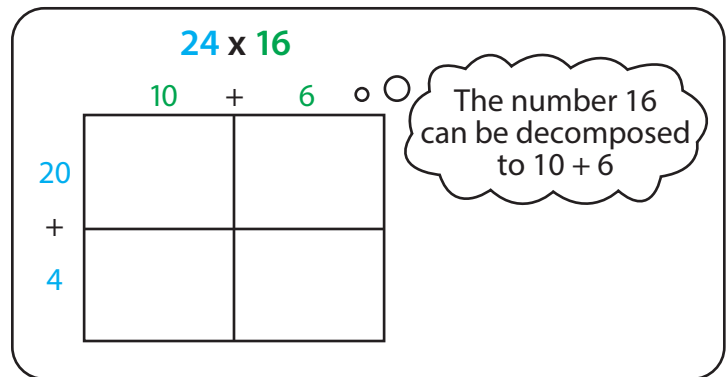Name: _____   Date: _____

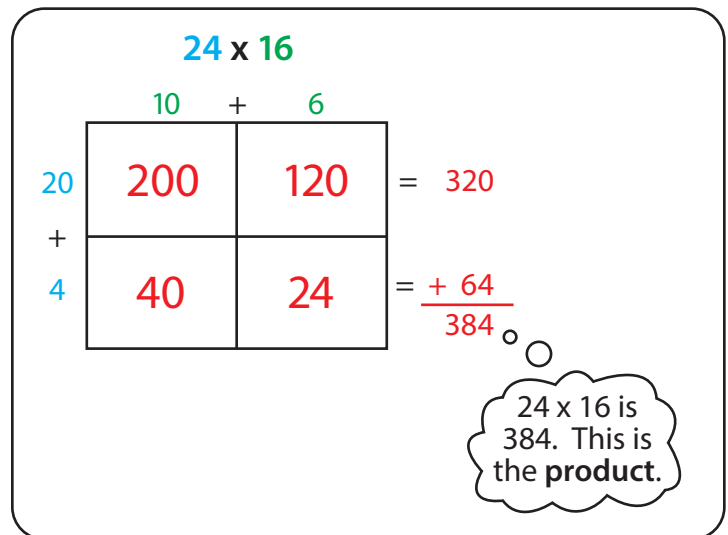# An Introduction to Area Model

The **area model** is a way to multiply using a visual model of a box. Each side of the box is labeled with **factors** (the numbers that are being multiplied). The factors are **decomposed** (separated) into tens and ones, which are easier to multiply with mental math.

24 x 16

	10	+	6
20			
+			
4			

The number 16 can be decomposed to 10 + 6

Since we know that the area of a rectangle can be found by multiplying **length x width**, we can use the visual model to find the area of each box. This means that each rectangle, or box, in the model represents a portion of the total answer.

24 x 16

	10	+	6
20	20 x 10 **200**		20 x 6 **120** ← partial product
+ 4	4 x 10 **40**		4 x 6 **24**
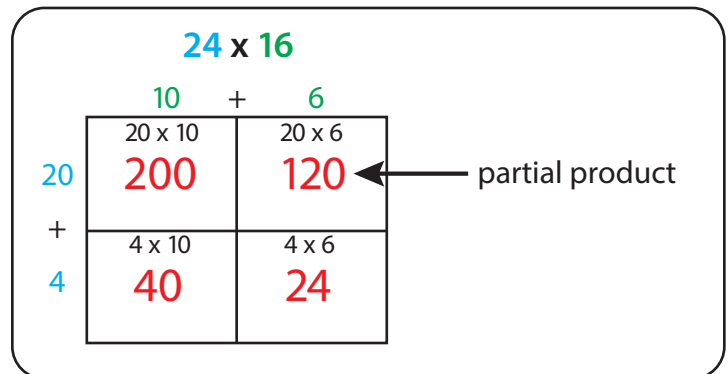
When the answers in each box, called **partial products**, are added together, we will get the total **product** (answer) for the multiplication problem.

24 x 16

	10	+	6
20	**200**		**120** = 320
+ 4	**40**		**24** = + 64

384

*24 x 16 is 384. This is the **product**.*

* This strategy is sometimes called the **box method** or **generic rectangle**.

Why do we use this strategy?

The area model strengthens our foundational understanding of multiplication, supports flexible thinking and number sense, connects to concepts of area that we have learned, and builds our competency in mental math, which will help us in real world situations. It can be used for day-to-day computation or as a bridge to understanding the standard algorithm.

Answers
An Introduction to Area Model
Try it! Solve each problem using an area model.

Example **13 x 57**

	10 +	3	
50	500	150	= 650
+			
7	70	21	= 91

650 + 91 = 741

∴ 13 x 57 = 741

25 x 31

	20 +	5	
30	600	150	= 750
+			
1	20	5	= 25

∴ 25 x 31 = 775

17 x 42

	10 +	7	
40	400	280	= 680
+			
2	20	14	= 34

∴ _17_ x _42_ = _714_

62 x 23

	60 +	2	
20	1,200	40	= 1,240
+			
3	180	6	= 186

∴ 62 x 23 = 1,426

This time, draw your own area model to solve!

14 x 35

|	10 +	4	
30	300	120	= 420
+			
5	50	20	= 70

∴ 14 x 35 = 490

Name: _____   Date: _____

An Introduction to Area Model
Let's Review! Fill in each blank with the correct vocabulary word.

1. Area model is sometimes called _____ box method _____ or _____ generic rectangle _____.

2. The answer to a multiplication problem is called the _____ product _____.

3. When we separate a number into smaller parts that are easier to use in mental math, we have

   _____ decomposed _____ the number.

4. The formula for finding the area of a rectangle is _____ length _____ x _____ width _____.

5. Numbers that are multiplied together to get an answer are called _____ factors _____.

6. A portion or part of an answer to a multiplication problem is called a _____ partial product _____.

7. What is one reason to use this strategy for multiplication? _____ Answers will vary _____

   _____

8. Paul tried using an area model to solve the problem 12 x 15, but he made a mistake.

	7	+	5	
10	70		50	= 120
+				
2	14		10	= 24
				144

   ∴ 12 x 15 = 144
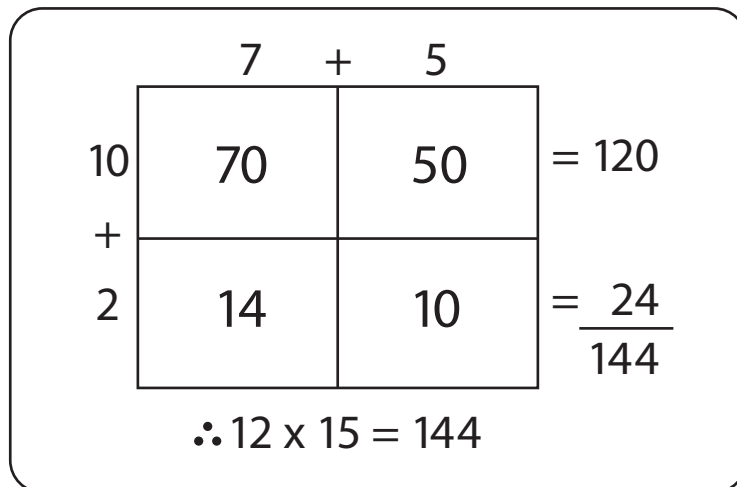
   What would you tell Paul to help him correct his mistake?

   Possible Answer: 15 should be decomposed to 10 + 5. 7 + 5 is 12, not 15. Paul should change the

   7 to a 10 and then find the answer.

   _____

   _____

   _____