Teacher Note

Multiplication Strategies

On the basis of the first step students take, their strategies for multiplication fall into the following 3 basic categories:

1. Breaking the numbers apart by addition
2. Changing one number to make an easier problem
3. Creating an equivalent problem

In the first strategy, students break the given numbers apart and create a series of partial products. In the second and third strategies, students change the problem in some way to create a problem that is easier to solve. Students often use a combination of these approaches when solving a single problem and may see their own variations or combinations as different strategies.

In order to use the strategies described in this **Teacher Note,** students need to understand the meaning of multiplication and have a good mental model of what is happening in the problem. They need to look at the problem as a whole, think about the relationships of the numbers in the problem, and choose an approach that they can carry out easily and accurately.

Using the distributive property is essential in solving multiplication problems. By using this property, students can break the numbers in any multiplication problem into parts and then multiply each part of one number by each part of the other number(s). For example, if the problem is 48×42, they might think of 48 as $40 + 8$ and/or think of 42 as $40 + 2$. This breaking apart is usually done by place but not always. For example, for the problem 27×18, the student might think of 27 as $25 + 2$.

It is not necessary for students to use the term *distributive property* or the notation $(40 + 8) \times (40 + 2)$. What is important is that they realize that the numbers can be broken apart by addition, that they know how to keep track of multiplying the parts, and that they add all the partial products to find the final product.

At the end of Grade 4, students should be able to use one or more of these strategies and record their solutions clearly. Although they may use one strategy most of the time, they should be able to consider solving a multiplication problem in more than one way. Students in Grade 4 spend a great deal of time studying strategies that involve breaking numbers apart by addition and changing one number to create a problem that is easier to solve. They will encounter the third strategy, creating an equivalent problem, in Grade 5.

Here are examples of the 3 strategies:

1. Breaking the numbers apart by addition

Many students choose to break the numbers apart by place and find all the partial products. Here are 2 ways a student might record this approach.

48×42		48	
$40 \times 40 =$	1,600	$\times\ 42$	
		1,600	40×40
$40 \times 2 =$	80	320	40×8
$8 \times 40 =$	320	80	2×40
$8 \times 2 =$	16	16	2×8
	2,016	2,016	

Note that because of the commutative and associative properties of multiplication and addition, numbers can be multiplied or added in any order.

For a simpler problem, students might break up only one number. For example, to solve 22×13, a student might break up only the 13, thinking of the problem as $(22 \times 10) + (22 \times 3)$, because both of these partial products are solved easily.

from Grade 4, Unit 8: How Many Packages? How Many Groups?

Multiplication
Computational Fluency and the Common Core
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