**Multiplying in Fourth Grade**

**The Break Apart Method**

32 x 8 = \_\_\_\_\_\_\_\_\_\_

 30 2

 30 x 8 = 240

 2 x 8 = 16

 256

*Useful for multiplying by 1 digit*

* Students break apart the multiplication

equation into manageable sub-problems,

usually following place value rules. They

solve each smaller problem and put the parts back together to get the final product.

**The Box Method (aka The Area Model)**

*Useful for multiplying by 2 digits*

* Students deconstruct the multi-digit numbers into their values by place and use them as headings for a box they draw. Each pair of numbers is multiplied and products are placed in their corresponding boxes in the table.
* The numbers in the boxes, or partial products, are added together to get the final product.

 46 x 32 = \_\_\_\_\_\_\_\_\_

 40 6 30 2

 40 6

 30 1,200 180 1200

 180

 2 80 12 80

 + 12

 1,472

**The Vertical Method**

 46

 x 32

 12 (2 x 6 = 12)

 80 (2 x 40 = 80)

 180 (30 x 6 = 180)

 1,200 (30 x 40 = 1200)

 1,472 (the final product)

**(aka The Partial Products Method)**

*Useful for multiplying by 2 digits*

* Students keep digit values whole based

on their places. For example, the 4 in

retains its value of 40 while the 3

in 32 is multiplied as 30.

**The Lattice Method**

*Useful for multiplying 2-digit by 2-digit equations*

* Similar to the Box Method, but

**4 6**

*1* 1 1

 2 8 **3**

*4* 1

 8 2 **2**

 *7 2*

 the numbers do not retain their

 place value. Rather, they are

deconstructed to a single unit

value. For example, the 4 in 40 is

treated as a single unit of 4.

* A box is drawn like in the Box

 Method, but diagonal lines cross

 each section. Each multiplier digit

 is written as a heading at the top

 and one side of the table. Thus,

the 4 and 6 in 46 are separated into columns.

* The 3 and 2 in 32 are separated so that each heads a row. The digits are then multiplied as facts. If the answer is expressed with two digits, the digits are separated in the corresponding box with the tens digit in the left half and the ones digit in the right half. When all the multiplying is completed, the digits are added along the diagonals and the totals are written along the outside edge of each corresponding diagonal. The answer is read left-to-right, starting from the upper left-hand corner of the table.

**The Traditional Algorithm**

*Useful for multiplying any numbers*

* This is likely the way adults multiply today because it is perceived to be the most efficient method. However, it is a rote method that is digit-oriented rather than number-oriented, making it confusing to students without a solid number sense and understanding of place value concepts. We usually teach it last, after we know children get how the numbers work in a multiplication equation.

**Multiplying in Fourth Grade**

**Additional Strategies**

**Cover the Zero Strategy**

*Useful for most multiplication in fourth grade as well as estimating products*

* When multiplying multiples of 10, students cover the zero(s) in the numbers and multiply the first digits left. Then students “put back” the zero(s) on the product.

30 x 7 300 x 70

Cover the zero: 3 x 7 = 21 Cover the zeros: 3 x 7 = 21

Put back 1 zero: 210 Put back 3 zeros: 21,000

Thus, 30 x 7 = 210 Thus, 300 x 70 = 21,000

**Estimating Products**

*Useful for getting a ballpark of where you answer will be*

* To continue to develop number sense and be more accurate mathematicians, students are encouraged to estimate the answers to problems before solving them so they have an idea of about how much their products should be.
* To estimate, students:
	+ Round each factor (if needed) to a multiple of 10 to form a new “friendly” equation.
	+ Use the Cover the Zero Strategy above to arrive at an estimate.

56 x 73 336 x 8

Round: 56 to 60; 73 to 70 Round: 336 to 300; leave 8

New equation: 60 x 70 New equation: 300 x 8

Estimate: 4,200 Estimate: 2,400