

Stephanie Whitney  
7<sup>th</sup> grade (would work for other grades as well)  
Alternative Ways to do Multiplication

A. Objectives

2.1.b Use the basic operations on integers to solve problems (7<sup>th</sup> grade PASS)

Process Standard 1:5 Apply a variety of strategies to solve problems (6-8 Process Standard)

My objective: Students will be able to perform multiplication in a non-routine way and be exposed to some of the history of mathematics.

B. Instruction

Raise your hand if you like long multiplication problems. (wait for response). Today we will learn two alternative ways to perform these sometimes tedious calculations.

**Lattice Multiplication**

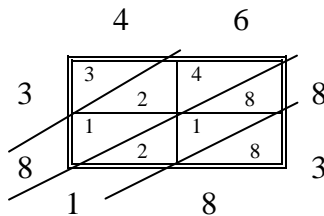
**History:** Lattice multiplication was first published in Europe in 1202 in Fibonacci's Liber Abaci. It was also thought to have been used by the early Hindus. Lattice multiplication is a method of multiplying large numbers, something that was considered quite difficult at the time.

**Instruction:** Now show the power point found at:

[http://classroom.jc-schools.net/ce/Lattice\\_files/frame.htm](http://classroom.jc-schools.net/ce/Lattice_files/frame.htm)

This power point was created by D. Fisher and is a clear, neat way to demonstrate lattice multiplication. (if you do not have internet access it would be easy to show students how to do these on the board or overhead).

One example of lattice multiplication is shown below.  $46 \times 83 = 3818$



## Russian Peasant Method of Multiplication

**History:** The Russian Peasant method of multiplication was used by the Ancient Egyptians to multiply large numbers. In the early 1800's some peasants in a remote area of Russia were said to be still using this method.

**Instruction:** Write the example  $20 \times 25$  on the board as shown below. Under the 20 (the first or left column) continue to halve the numbers, discarding remainders until you reach 1. Under the 25 (in the right column), double the numbers. Cross out the rows which have an even number on the left, and add up the remaining digits on the right. See example 1 below.

<del>20</del>	<del>25</del>
<del>10</del>	<del>50</del>
5	100
<del>2</del>	<del>200</del>
1	<u>400</u>
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">500</div>

After creating the two columns, we cross out the rows with 20, 10, and 2 because those were the even numbers. On the right we still have the numbers 100 and 400. We now add those to get an answer of 500.

Example 2:  $38 \times 46$

<del>38</del>	<del>46</del>
19	92
9	184
<del>4</del>	<del>368</del>
<del>2</del>	<del>736</del>
1	<u>1472</u>
	<div style="border: 1px solid black; padding: 2px; display: inline-block;">1748</div>

C. Assessment

Name\_\_\_\_\_

Use Lattice Multiplication to multiply the following numbers:

1.  $39 \times 43$

2.  $102 \times 54$

3.  $86 \times 63$

4.  $175 \times 9$

5.  $941 \times 8$

6.  $8360 \times 294$

Use the Russian Peasant Method of Multiplication to multiply the following numbers.

7.  $50 \times 24$

8.  $260 \times 48$

9.  $63 \times 76$

10.  $22 \times 75$

11.  $294 \times 56$

12.  $836 \times 15$

#### D. Modification

This lesson could be taught to any grade level from upper elementary to high school. Examples on the assessment might be made easier for elementary or lower level students, and larger numbers could be used if desired for high school students. I would probably not teach this lesson to students who did not already have a firm grasp on multiplication as it might cause confusion. This could be broken into two days if the two concepts were too much for your students.

#### E. Reflection

The students really enjoyed this lesson. We did this on a day when several students were absent and it was a fun activity for those who remained. I plan to do similar lessons on Napier's Rods and any other creative multiplication processes I can find.