

Math Lesson

Place Value Sections - Multi-Digit Multiplication

5th Grade

State Standard(s): 5.NBT.5 Fluently, efficiently, accurately, and flexibly multiply multi-digit whole numbers using an efficient algorithm.

Student Learning Objective(s): TSWBAT understand how a place value model can be used to solve multi-digit multiplication problems.

- **Materials:**
 - [Place Value Sections Practice](https://drive.google.com/file/d/1H9PQRDEhJoOe5Ie7pb12wx2DXB0WZeXu/view?usp=sharing)
 - [PVS Practice Answer Key](https://drive.google.com/file/d/1YsoNIMgUXzTYJ1koErEh6hu_COwkYusL/view?usp=sharing)
 - [Double Digit Multiplication Dice Game](https://drive.google.com/file/d/1n-CA6-ECWH12XAjUqXAJHSob-ISr39yL/view?usp=sharing)
 - One die/number cube per table group
 - [Place Value Sections ISS](https://drive.google.com/file/d/1x2HyLun-ohBLYBXO-hMSyY72SM744P3g/view?usp=sharing)
 - [PVS ISS Answer Key](https://drive.google.com/file/d/1L5ouDEBJU8bmLupnQvRjEBjYvNhRJS7L/view?usp=sharing)
 - [Advanced Place Value Sections ISS](https://drive.google.com/file/d/10F6A4eMjSJXqOqsieFbPrsefetO6VkXA/view?usp=sharing)
 - [Advanced ISS Answer Key](https://drive.google.com/file/d/1P7CaCCeueC0IR0VTfwF8ztBG8XUWwkvr/view?usp=sharing)
 - [2 by 2 Place Value Section Template](https://drive.google.com/file/d/1Gdt0heaFUQdhQEE_3ordy_w96soOIQUv/view?usp=sharing)
 - [3 by 2 Place Value Section Template](https://drive.google.com/file/d/1RpbLBob-CcyrvbaFbedSPxy83wdi9s8q/view?usp=sharing)

ARK:

Draw a rectangle that has a length of 7 and a width of 4. Ask the students how they would find the area. Talk about how easy that was and how they could just use mental math. Explain that today we will be solving multiplication problems that can't be easily solved using mental math. We will be using something called an area model, or place value sections, to solve more complicated multiplication problems.

I do:

The teacher will explain what an area model, or place value section, is and how to use it. Work it out on the board as you're explaining.

*When we think about area, we know it's length x width. 7×4 is easy to multiply in one step. But 67×43 is not so easy to do in one step. If we break up the rectangle into Place Value Sections, we can do it much easier. All the smaller sections of the whole are called partial products. After you find each of the partial products, you can add them together to find the whole answer. **2,881***

43×67		60	+	7
40	$40 \times 60 = 2,400$		$40 \times 7 = 280$	
+				
3	$3 \times 60 = 180$		$3 \times 7 = 21$	

We can also find the same answer without having to draw the rectangles. $(40 \times 60) + (40 \times 7) + (3 \times 60) + (3 \times 7)$. This method is called expanded notation. **2,881**

The teacher will work through problem 1 on the [PVS practice sheet](#). Teacher will ask the students if they have any questions about PVS/expanded notation or if they're okay to move on (answer any questions students may have).

We do:

Teacher will work through problem 2 with the students working the problem on their own worksheets. Students will do problems 3 and 4 with their table groups. Check them as a class.

It is okay to let the students know that they do not have to use the PVS rectangles to solve these problems. If they prefer/are able to understand the expanded notation or standard algorithm, they may do so.

[Answer Key](#)

Two do:

The students will play the [Double Digit Multiplication Dice Game](#) with their table groups. Each student will get a problem sheet and each table will get one point sheet and one number cube. Player 1 will roll the die and write down whatever number he/she gets in the first box of the first problem. He/she will roll the die 2 more times and write those numbers in the other boxes. He/she will then solve the problem. They may choose a strategy to use to work out the problem (in their head, on their whiteboard, the [PVS template](#), standard algorithm, etc.). The student will record their answers on the point sheet. Players 2, 3, 4 will repeat these steps and so on. Once each player has answered all of the questions (or whenever time is up), they will go back to the answer sheet and add up all of their answers. The player with the highest total wins! If short on time, the students do not have to add up their total score or they can do it at a later time.

(If I rolled the die three times and rolled a 3, 4, 2, and 6, I would fill those in the boxes so I am creating my double-digit multiplication problems, 34×26 .)

You do:

Once the students have finished the dice game, the students will do problems 5 and 6 on their own. They will then self check their answers at my table. The [answer key](#) will be available. These problems will not be collected for a grade.

ISS:

After they have gotten problems 5 and 6 checked, they will work on their own to complete the [PVS ISS worksheet](#). When finished, they will turn it in to be checked for understanding.

[Answer Key](#)

Above-level students and students who would like a challenge will work on the [advanced PVS ISS worksheet](#) after they have completed the regular worksheet first (this will not be for a grade).

[Answer Key](#)