

TEACHING MULTIPLICATION

What To Do When Johnny or Suzie Can't Multiply... By Greg Cruely

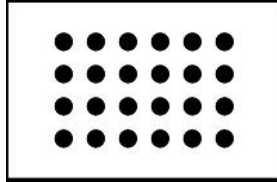
Not every child has an easy time learning how to multiply. There are some basic approaches available for solving this common dilemma for kids in the intermediate grades.

If you work with a child in the fourth, fifth, or sixth grades who's frustrated by multiplication, there is hope. Math doesn't have to be confined to the realm of simple (but boring) memorization. It's always nice if a child can memorize multiplication facts. It's more important for them to have some approach they are comfortable with for solving problems.

Learn Basic Multiplication Facts

Often the roadblock to progress in math is a student's failure to learn basic multiplication facts: four times seven is 28, nine times six is 54. You memorize that, right? Well, not necessarily.

Memorization is the norm, but if the child has difficulty with that you can teach the child how to quickly figure out the product of two single digit numbers by visualizing (or actually drawing) a rectangular array.



Drawing rectangular arrays is a simple process. If the problem is three times nine, the student draws three rows of nine dots. Counting the dots in the array will tell the student what the answer to the "three times nine" problem. When students first start using this strategy, the difficulty is convincing them that they have to be neat with it; they have to line their rows up to be sure that they have three rows of nine dots. Otherwise they'll wind up with extra dots and get wrong answers.

Several issues come up in this process. Students have to believe that figuring out what six times four is will help them solve a problem like 62 times 24; if they don't believe that, they think they're wasting their time. Students often feel self-conscious about employing an obvious strategy that other students don't need - they'd rather be wrong than embarrassed. These issues have to be worked through.

Multiplication Algorithms

The traditional approach (or algorithm) for double digit multiplication is the most abstract and difficult one. Yet many adults think it is the only approach. Take a simple problem like 7,248 times 3 and try to explain the traditional method: three times eight is 24, write down the four and carry the two; three times four is 12, and don't forget to add the two you carried which makes it 14... You

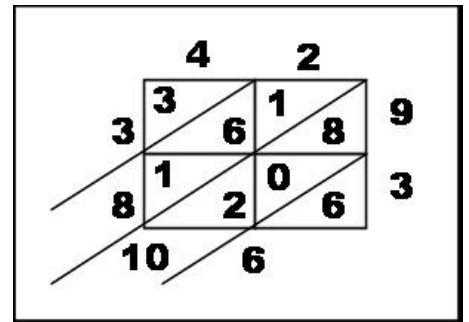
get the idea.

There are two main algorithms that get used with kids in intermediate grades as alternatives to the traditional approach. The first is the partial product algorithm. It takes the problem we've mentioned (7,248 times 3) and splits it into four smaller, component problems: 3×8 , 3×40 , 3×200 , and 3×7000 . Add the answers to those four problems and you have the answer to the large problem (see image).

7,248	
X 3	
<hr/>	
24	3×8
120	3×40
600	3×200
21,000	$3 \times 7,000$
<hr/>	
21,744	

A second algorithm, the lattice method, involves drawing a window with diagonal lines across it. Kids tend to like it because it's more novel (and because they think they get to draw). The image below

shows how 42×93 would be solved using this method. Students cross reference the digits and write their products in panes on the window. Then they add down the diagonals (color coded in the image); the basis from an answer appears along the bottom and left side of the lattice. The student has to "carry" with any double digit answers on a diagonal: 3,8,10,6 becomes 3,9,0,6 -- or 3,906.



Conclusion

Be sure the child is motivated to get an answer (often the biggest problem). Be sure they believe that being able to figure out the single digit multiplication facts will make it easy to solve larger problems (otherwise problems like 271 times 38 look just look overwhelming). Be sure the child has practiced a variety of ways to solve the problem and found one they're comfortable with.

It sometimes also comes down to the flexibility of the teacher. Is the teacher concerned with the answer, or focused on method? If a kid gets criticized for having to do something visual (like draw an array) or tactile (like count on his fingers) to arrive at a math fact, that's a problem. And if the teacher will only mark it correct if they use the traditional method, it's probably time for the teacher to retire....