

Building a Strong Mathematical Mind – Strand 1: Drills

It's a Classroom Taboo, but Missing Out Could Hurt your Child's Learning

In North America the term “drill” has been considered, like the unmentionable name ‘Voldemort’ in the Harry Potter series, a “taboo” word. In fact, many teachers say they aren’t allowed to give any drills in their classrooms because they could get into a lot of trouble. Whether the boycotting of drills began with a single teacher or school, it progressed to the boards, the ministries and now to a realm of being considered socially unacceptable to have students do drills. But this boycott is having a negative impact on our children’s education. The truth is; practicing math drills is critical for developing math skills.

For several years, I helped a local community initiative that was assisting low-income students with their academics. With these free programs, you never know who is going to attend from week to week and you have to be very flexible. I was given 30 minutes each Saturday to provide a math program to students ranging from grades 1 through 10. Many of the students who came had very poor math skills. I thought carefully about what to provide them so that they would establish a skill set that would empower them for the rest of their lives, and that would help them in their future mathematics. I decided to give them the Spirit of Math drills. For the first six months, it was all we focused on.

At the 5-month mark, I asked some of the weaker students how their math at school was progressing. A grade 6 girl, who had really struggled at the beginning of the year piped up. “Great!” she responded enthusiastically. So I asked her how the drills were helping. She said that she was doing geometry and measurement at school and the teacher said that the width of the rectangle was 7 and the length was 8, therefore the area was 56. Whether she realized it or not, this girl told a very revealing and insightful story. She used to be

failing, not because she wasn't able to understand the concepts, but because she didn't know where the numbers came from, so she would have been lost at the "56", wondering how the teacher "magically" came up with that number. Now she knows. It isn't a mystery anymore. The numbers make sense, and she is able to follow the teacher.

Research has shown that drills do work, but be careful, because many are ineffective. It was these ineffective drills that gave drills a bad name. Find the right drill system and your child will develop a fluency in numeracy that will set them up for a life-long understanding of numbers.

To determine if your child's drill system is good, ask yourself these important questions:

1. *What is the purpose of the drill?*

The main purpose of a drill is to develop an automaticity and fluency of facts. In math, it can include addition, subtraction, multiplication, and division. At Spirit of Math Schools, students also do decimal equivalence drills (from $\frac{1}{2}$ to $\frac{1}{12}$), fraction addition drills, perfect square drills (from 12 to 602), percent drills, radical drills and radian to degree drills. We believe that a student should not just know the facts, but know them so well that their minds are calculating without realizing it.

2. *Are the drills themselves actually developing the skills?*

The old fashioned drills – giving a sheet of questions to see how many questions the student can do – is an ineffective and outdated way of doing mathematics. Provide drills that will consistently reinforce the facts and simultaneously push the student to retrieve them faster.

3. *Can you clearly see students' progress?*

There should be a way to measure a student's progress each and every time they do a drill. In Spirit of Math Schools, students plot their results on individual graphs, after every drill. In addition, they have a class average graph so that they can see their own progress and compare to other classes. Teachers, students and parents can immediately see if progress is being made.

4. *Is there a goal set that is well defined and challenging to achieve?*

Goals help to hold students accountable. Students should know what level they must achieve before passing that drill and going on to another one. Very strong drills will also hold the students accountable to each other: their learn-

ing affects others too.

5. *Does the drill set a high standard?*

It is not good enough to just know the number facts. Students should be able to retrieve the facts and use them at almost lightning speed. The drills should be timed.

In Spirit of Math, grade 5 students are given 10 minutes to complete 80 three-digit x one-digit multiplication questions in a grid. When the class average reaches 70 out of 80, the students move on to the next drill.

There is so much involved in mathematics. Drills are just one strand, but a very critical strand. I always say that asking a student who doesn't have an automaticity or fluency of number facts to do math, is like putting a student with crutches into a running race. There is no way that the student with crutches will be able to properly keep up, never mind, compete with the other racers, and it is the same with math.

For more information about Spirit of Math visit: <https://spiritofmath.com>.

