

## THEY CAN LEARN

*Nora Mac Dowell  
Fremont Ross High School  
1100 North Street  
Fremont, OH 43420*

Students at the high school level with severe math deficiencies need special attention. With the state requirement of two math credits for graduation and the coming of competency testing, these students can no longer be overlooked. They have not learned sufficiently in the traditional classroom.

These students have a combination of difficulties with math, school, and life in general. If the school is going to effect any change in math ability, we must change our methodology to reach the entire student. We need to begin with the "I'm dumb and I don't care" attitude most of these students have. This attitude has been reinforced over the years by the student's failures, by parental acceptance of those failures, and by frustrated teachers who have added to the failure. To change this attitude, the student needs to experience a series of successes and positive peer reinforcement.

I provide a positive environment for success with a type of math lab program. This is a workable, individualized remedial math course based on the positive success of the individual student. It is intended for those secondary students who have not mastered many of the basic skills in whole numbers, decimals, or fractions. The course is structured to allow for the greatest growth and flexibility possible.

MATH LAB consists of nine major topics. These topics are subdivided into learning units. Each unit consists of an explanation sheet, a series of worksheets, a self-test, and two mastery tests. The first three whole number topics (addition, subtraction, and multiplication) are treated as one unit per topic. A diagnostic test is given for each topic, and then a prescription is made to decide which worksheets the student is to start with. After working and grading the worksheets, the student takes the self-test. If competency is shown, the student then takes a mastery test. A score of 75% or better on the mastery test allows the student to advance to the next unit. If mastery is not achieved, the student continues working on the material and then repeats the mastery test when greater competency is shown. Division of whole numbers also has a diagnostic test which provides information for a prescription which places the student in the appropriate unit or units. After the

whole number objectives have been mastered, the student moves through decimals, fractions, and ratio-proportion-percent units in that order. The student is required to complete the explanation sheet, at least two worksheets, any special worksheets, and the self-test. When proficiency is shown, the student takes the mastery test.

For those students who complete this part of the program, the last two topics, pre-algebra and equations, await. These topics are not reached by the majority of students; but, for those who do, the program shows them that these topics can be learned.

Since this will be the final math course for many of these students, some basics of everyday life are incorporated. Six times a year I use two weeks to teach a "mini-course" to the entire class. These mini-courses include checking and savings, loans, budgets, measurement, formulas, and calculators.

My role as teacher in the MATH LAB program allows me the maximum possible student contact. I can interact with each student on a daily basis. The interaction may be a pat on the back for a good job, a two-second answer to a question raised, a ten-minute explanation of a process, or even a friendly cajoling. This gives me the luxury of knowing my students, of building their self-confidence, and of being able to give them instant feedback.

Grading in this program is also an individualized process. Quarter grades are an average of the mastery test, mini-course, "potential", and daily work grades. The first two grades are very objective in nature. However, to allow for the individual differences, subjective grades also are needed, such as the "potential" grade. This reflects the student's work potential. For example, a student completing only one unit in a quarter may receive a 95% in this area. It may be all s/he is capable of doing. Another student, completing only the same unit, may receive a 60%. This student may have been capable of much more with a little effort. This grade allows each student to be evaluated on the merits of his or her own work. Daily grades may be affected by improper behavior, sleeping, or unexcused absences.

Exams are given at the end of each semester. A student is given one of thirteen different exams, appropriate to the student's progress. The exam is valued at 70 points plus 30 points from the mini-courses. This creates an exam with the same attention to individualization as found in the MATH LAB program itself.

With the flexible structure of the MATH LAB program, many different learning experiences can be used. Manipulatives, computer drill, listening tapes, and special projects all can be incorporated and aimed at those students who can benefit most. The teacher is not restricted by the rest of the class. If three or four disruptive students cannot handle manipulatives, the activities simply are not prescribed for those students.

MATH LAB allows for a variety of students. Students from L.D. and D.H. programs can be mainstreamed. The notorious behavioral problems can be dealt with on a one-to-one basis without stopping the entire class. Those students who are absent for long and frequent stretches are not lost when they return.

MATH LAB is not a panacea. There are students who will not put forth any effort; however, most do respond. When they see that the material is comprehensible and that they can achieve, the majority of students see their first real success with math. It is amazing to watch a face light up as a mastery test is graded and a score of 100% is placed at the top. It is euphoric to be asked what is wrong with a problem which was missed. These are the same students who were convinced that there was no alternative to failure in math and they had accepted their fate. Once students begin to experience success—they can care! They can learn!

If you have questions please contact me and I'll be happy to supply additional details.

---

Why do we say "extract the root" of an equation?

According to D.E. Smith, *History of Mathematics Volume II* (pp. 150–151):

"The Arab writers conceived a square number to grow out of a root....Hence, the works translated from Arabic have radix for a common term....and the Arab writers 'extracted', or pulled out, the root....The fact that from radix we have both 'radical' and 'radish' makes the use of 'extract' more easily understood."