A bout 120,000 8th graders taking algebra have math skills at the 2nd-grade level — at best. My guess is that there are hundreds of thousands more in those algebra courses whose skills are not much better. This is because of a widespread belief that algebra is a “gateway” course.

We get to the 120,000 figure via Brookings Institution researcher Tom Loveless, who worked with National Assessment of Educational Progress (NAEP) limited-use data, which allow researchers to drill down to the individual student level in analyses. Loveless finds that the number of low achievers, students who make up the bottom 10% of NAEP scorers, increased from 3% of those tested in 2000 to 7.8% in 2005. The latter percent yields the figure of 120,000. I imagine that the next 10% also didn’t fare well.

Loveless figures this number means the average 8th-grade algebra teacher with 26 students has two students who, essentially, don’t know any math. He calls them “misplaced” students. “The misplaced 8th graders score an average of 211 [on NAEP], which is 27 scale score points below the national average for 4th grade. Analysts consider 11 NAEP scale points as about equivalent to one year of learning, which means that these misplaced students know about as much as a typical 2nd grader. Advanced students (the top 10% in Loveless’ scheme) score about one year above grade level. The misplaced students function about seven grade levels below peers in the same courses.” The overall 8th-grade average on NAEP is 279; for students at the top, it is 291.

Loveless presents a couple of NAEP released item results to indicate the scope of the problem. Here they are:

There were 90 employees in a company last year. This year, the number of employees increased by 10%. How many employees are in the company this year?

While 48.7% of students in advanced courses answered correctly, only 9.8% of misplaced students did. That is far less than chance.

Alba needed to know about how much the sum of 19.6, 23.8, and 38.4 is. She correctly rounded each of these numbers to the nearest whole number. What three numbers did she use?

Almost 88% of advanced students answered correctly, but only 37% of misplaced students got it right.

Loveless also presents data for three more nonreleased items that show similar results, including one where 57% of advanced students responded correctly, compared to only 3.9% of misplaced students.

Large numbers of students are taking algebra for which they are unprepared in settings that are not particularly conducive to learning.

Loveless describes the typical rationale for 8th-grade algebra: “General or remedial math courses tend to be curricular dead-ends, leading to more courses with the same title (for example, General Math 9, General Math 10) and no real progression in mathematical content. By completing algebra in 8th grade — and then completing a sequence of geometry as freshmen, advanced algebra as sophomores, and trigonometry, math analysis, or pre-calculus as juniors — students are able to take calculus in the senior year of high school.”

Assuming, of course, that the kids haven’t dropped out, frustrated to tears by incomprehensible math. Loveless presents no arguments that all students should take algebra or calculus.

But he does make the case that learning algebra is a civil rights issue, particularly as presented by the Algebra Project’s Robert Moses in a paper for the U. S. Department of Education, Algebra: The New Civil Right. Evidence for a civil rights dynamic comes from looking at the background characteristics of the misplaced students: They are overwhelmingly black and Hispanic (77% vs. 32% of all 8th graders) and likely to qualify for a free or reduced-price meal (70% vs. 30% in all advanced classes and 36% in the nation).

Most of the misplaced students attend large urban public schools (average size 1,012 student vs. 794 in the nation). Only 2.3% of them attend private schools. Their schools are more likely to report that math is untracked (35% vs. 23% in the nation). In these schools,
their teachers have less experience and are less likely to have a regular teaching certificate and to have been math majors as undergraduates. “In less than two decades, policies designed to push 8th graders into algebra classes have succeeded in doubling the percentage of students enrolled in advanced mathematics. The data assembled here document a stark consequence of such policies: large numbers of students taking courses for which they are unprepared in settings that are not particularly conducive to learning.”

We have not seen the end of this policy push. In 2011, for example, all California 8th graders will be taking algebra. Loveless calls it “false democratization.” “No social benefit is produced by placing students in classes for which they are unprepared.”

Loveless displays a curious lack of sympathy for the misplaced students as victims of the misplacement. He saves it for the teachers. He addresses those who will continue to plump for algebra-for-all:

They believe that a more rigorous course is always preferable to a less rigorous one. They will argue that keeping remedial students out of algebra denies these students the opportunities that good math students take for granted. What they will not say is this: the burden of realizing such an idealistic view of mathematics learning falls on the classroom teacher. Teachers are expected to make up for students’ skill deficiencies. If students enter algebra classes without the preparation to succeed, then algebra teachers must find a way to fix the problem. . . . In 8th grade, they [the misplaced students] are expected to learn in a single year, the six years of math they have not yet learned along with a full year of algebra. No one — no teacher, no researcher, no governor, no school board member, no philanthropist — knows how to teach in one year what has not been learned in six and then how to teach algebra on top of that. Algebra teachers are being asked to do the impossible.

So what to do? Loveless has four suggestions:

1. **Get the goal right.** Loveless thinks California is right because they have a test, not a course requirement. He doesn’t understand why it is at 8th grade.

2. **Teach and assess the prerequisite skills.** Loveless cites a study showing that 4th-grade scores in California were as good as 9th-grade scores in predicting success on the California high school exit exam. To me, that implies that kids fall into a rigid hierarchy of ranks early: Low-scoring 4th graders don’t become higher scoring 9th graders.

3. **Early intervention.** Perhaps this would make the hierarchy noted above more flexible. “Mandating algebra in 8th grade is the equivalent of mandating, by policy, that all buildings immediately erect a 50th floor — regardless of their current height.”

4. **Collect data, conduct research.** Loveless observes that California Governor Arnold Schwarzenegger compared the algebra mandate to Kennedy’s plan to put a man on the moon. But Kennedy didn’t promise a man on Pluto or Venus. “He said the moon because the principles of physics, decades of experiments with rocketry, and the early success of Russia and the United States proved that it could be done. No such science supports algebra for all 8th graders.”

Loveless supports everyone learning algebra at some point, citing a study with which I and a number of others have taken issue. For that view, see Gerald W. Bracey, “The Malevolent Tyranny of Algebra,” *Education Week*, 25 October 2000.

Loveless’ report is at www.brookings.edu/reports/2008/0922_education_loveless.aspx.

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**Correction**

“The 18th Bracey Report on the Condition of Public Education” (October 2008) incorrectly said that the Teacher Leaders Network (www.teacherleaders.org) is sponsored by *Teacher* magazine. The network is sponsored by the Center for Teaching Quality but has a partnership with *Teacher* magazine to provide regular essays and blog pieces.