THE WALL STREET JOURNAL.
WSJ.com

OPINION | May 6, 2013, 7:06 p.m. ET

Republicans Should Love 'Common Core'

National standards can revive the way we teach math and science.

By EDWARD FRENKEL AND HUNG-HSI WU

The Common Core State Standards are a set of rigorous academic standards in mathematics and English language arts. They are the culmination of a meticulous, 20-year process initiated by the states and involving teachers, educators, business leaders and policy makers from across the country and both sides of the aisle. The standards form a foundation for a high-quality education, have been adopted by 45 states and the District of Columbia, and are slated for full implementation in 2014.

Unfortunately, the Republican National Committee recently adopted a resolution rejecting the Core Standards, calling them a "nationwide straitjacket on academic freedom and achievement." This resolution and efforts under way to repeal the Core Standards in several states are misguided and have to be resisted.

Mathematical education in the U.S. is in deep crisis. The World Economic Forum ranks the quality of math and science education in the U.S. a dismal 48th. This is one of the reasons the 2010 report "Rising Above the Gathering Storm" by the National Academies warned that America's ability to compete effectively with other nations is fading.

The crisis is caused by the way math is currently taught in schools. Today, most students are forced to learn mathematics through textbooks that are often incomprehensible and irrelevant. These textbooks, which are widely adopted across the states, create mediocre de facto national standards—and, worst of all, alienate students from the material. The Core Standards address these issues head-on and finally offer hope for a better math education.

To give one example, consider the fraction-phobia that has beset U.S. schools. Fractions are taught either by using pieces of pizza, or by using ill-defined notions like "ratio."

It is fine to refer to pizza slices as an example of a fraction: If a pizza is cut into six equal slices, each of them represents 1/6 of a pizza. But this way of thinking offers only a limited
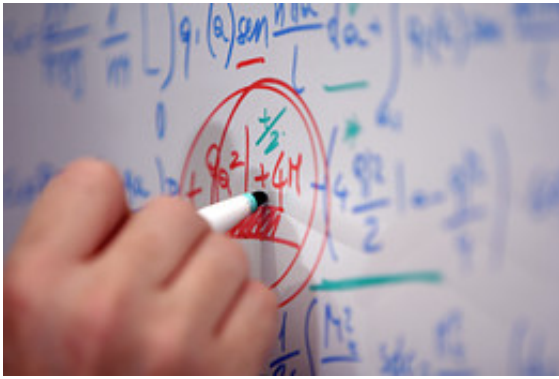
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perspective. Adding 1/6 and 2/6, say, is clear: This would be like combining one slice with two other slices to get half a pizza. But what about multiplying two fractions? What would the product of two pizza slices be? And don't even bother asking about the negative of a fraction. (A negative pizza slice, anyone?)

No wonder students and teachers are at a loss. This all-important concept is obscured to the point where students are effectively rendered incapable of using fractions and are forced instead to memorize formulas without any real understanding. Such non-learning severely handicaps students' ability to learn other mathematical concepts and skills, especially in algebra. Ultimately it keeps them from studying science, technology, engineering and math in college, and pursuing careers in these fields.

Clearly, fractions should not be taught using only pizza slices, and this is where the Core Standards make important improvements. According to the Core Standards, fractions should be defined geometrically as points on a number line. Students mark whole numbers as a sequence of equidistant points on a line, like an infinite ruler. They then mark fractions. For example, 1/2 is the point on the line half-way between 0 and 1, and 1/3 is the point a third of the way from 0 to 1.

Once this is done, students can identify any fraction with the length of the segment between 0 and the fraction itself, like a ruler. In this framework, it becomes crystal clear what the addition of fractions means: It is the total length of the combined segment when the two segments are put together end-to-end. Likewise, multiplication is the area of the rectangle formed by the two line segments, just like the multiplication of whole numbers.

It is important to stress that the adoption of Core Standards and how best to test students are two separate issues. While testing is essential, standardized tests have their perils, not least that they often encourage mindless memorization. This issue needs to be further discussed, and special care has to be taken to design adequate tests.

The Republican National Committee is opposed to the Core Standards on the grounds that education is the prerogative of the states and their school districts. But this argument ignores the fact that mathematics represents objective, timeless and necessary truths. These truths apply uniformly and equally to any citizen, regardless of geographic location. Fractions mean the same thing in Iowa and Alabama as they do in California and Texas.

It is more important than ever that we create a level playing field to give students from all states equal opportunity to thrive in our technology-driven world in which formulas

and equations play a crucial role. With more and more jobs requiring more and more mathematical knowledge, we are obligated to provide our children with equal access to a quality mathematics education, and this is the whole point of the Core Standards.

The only way to combat the current lock-step march to the bottom of international student performance in math and science is to implement rigorous national standards. That is why parents, teachers and policy makers should oppose efforts to scale back the hard-won and necessary Common Core State Standards.

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