

Utah's Math Education Moonshot

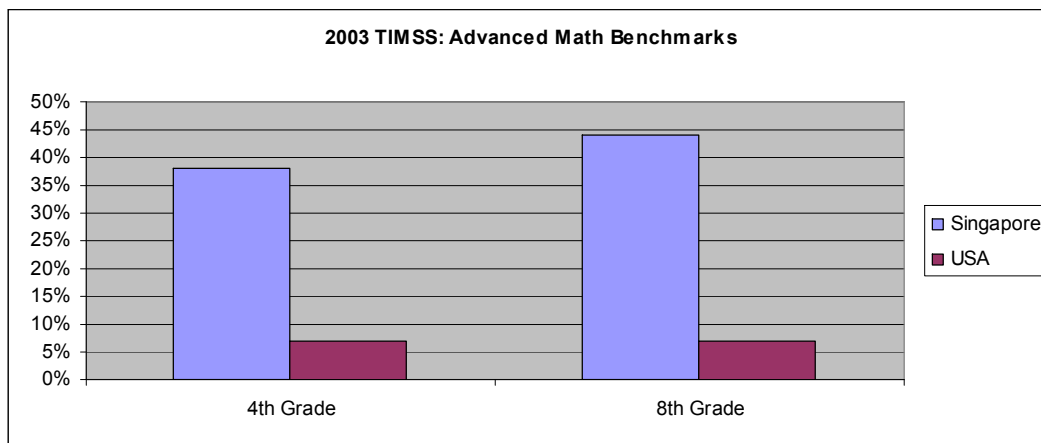
The engineers and scientists that have taken us to the stars and improved our quality of life in innumerable ways are now retiring, creating a critical shortage of qualified individuals to replace them. This gives Utah a golden opportunity to create a population of engineers, scientists and highly skilled technical personnel to fill the vacuum. This effort would entice top companies to locate in Utah and utilize our premier workforce. To accomplish this objective we should adopt this mission statement.

Mission Statement: *Utah will become the premier state in our country for math education within 10 years by partnering with members of the NASA Advisory Council and the National Mathematics Advisory Panel to create standards and programs such that NASA will look first to Utah for at least 10% of its recruits and Utah is recognized as a top source of skilled scientists and engineers.*

Utah's Plan of Action

1. **Curriculum:** Singapore math implemented in grades K-8 for a cohesive program through algebra. High school math should provide rigorous college preparation classes.

"We are not teaching math, we are teaching thinking through the medium of math."
--Dr. Yeap Ban Har, Ministry of Education, Singapore



2. **Standards:** A full rewrite to match Singapore math.
3. **Testing:** End-of-level tests should reveal basic to advanced subject mastery.
4. **Algebra:** Eighth grade math should be an authentic algebra course. Those who score at the advanced level on the end-of-level test receive high school credit for Algebra 1.
5. **Student Progress:** Gifted and motivated students may proceed faster than regular classes.
6. **Schedule:** Math should be taught daily and total at least 144 hours of instruction and testing time each year.
7. **Mathematically knowledgeable classroom teachers:**
 - a. Teacher Preparation—better preparation of elementary teachers and a higher level subject matter certification for secondary teachers
 - b. Teacher Leaders—Singapore math trainers and single subject math teachers for 4-6
 - c. Teacher Evaluation—value added analysis for student achievement
 - d. Professional Development—Common curriculum training for Singapore math

"Singapore ranked first in the world in math and third in science, ***in spite of the fact that the country was ranked next to last for the level of home educational resources available.*** In other words, Singapore's impressive academic results seem to have very little to do with an advantageous home environment and a great deal to do with an effective school system structure organized around a solid, rigorous curriculum." --Dr. E.D. Hirsch

Talking Points

Singapore has been the #1 nation in the world for math for 12 years running. (TIMSS exam)

Imagine a state where 40% of the population had an advanced understanding of math.

Utah is not above the national average when compared demographically to other states. Our 82% Caucasian population unfairly increases our weighted average score.

Utah ranks dead last in math when compared to our peer states.

"Utah test scores are startling" Deseret News 11/02/07

20% of Utah seniors failed the math portion of the UBSCT exam. In Singapore, only 0.2% of 6th graders don't pass a high-stakes exam to advance to 7th grade.

Myth: The TIMSS exam only tested the best and brightest in Singapore and not the students who weren't going into math intense studies.

Fact: The TIMSS exam represents a cross-section of the entire population. The fact that Singapore students have nearly 40% advanced mastery in 4th grade before any separation of students occurs is proof they are not cheating the test.

Myth: In Singapore the culture is different and children are so focused on education that's all they do. It's not fair to compare them to our children.

Fact: Dr. Yeap Ban Har corrected this myth during his June 12, 2008 visit. He stated:

- Children have an hour to an hour and a half of homework a day (all subjects combined)
- They have many extra-curricular activities like sports, music, and clubs
- The parents there are encouraged to keep the TV off while children do their homework

Singapore math books do not have clutter and distraction. There is coherent development. They use short, precise definitions. They take a concrete to pictorial to abstract approach.

What makes the difference between Singapore and American math? An extremely well thought out curriculum with brilliant modern-day models, and tests that clearly show subject mastery. A decade ago Singapore had 90% of its elementary classes taught by non-college graduates. Now they are down to only 50%. Teachers are only one element of the success of their program. The brilliance is in the curriculum. Utah should adopt this program and spend the money to fully implement it.

Quotes

"NAEP classifies its problems as "easy," "medium," or "hard." I benchmarked the "hard" 8th grade problems, examining NAEP's highest level of expectation for 8th grade math. Most of these "hard" 8th grade problems are at the level of Singapore's grade 5 – or lower."

--Dr. John Hoven, Economist in the Antitrust Division of the U.S. Department of Justice; Co-president of the Gifted and Talented Association of Montgomery County, MD

"My point is simple: There is a chasm of difference in expectations between NAEP and the problems used by world-class mathematics leaders. We expect too little from our children, and by lowering our expectations we lower their incentive to achieve."

--Dr. John Hoven

To Sign in Support of this Plan Please Visit:
www.UtahsMathFuture.com