Testimony of Oak Norton to the Appropriations Sub-Committee of the Utah Legislature Regarding Adoption of California's Math Standards by Utah's State Board (2/2/2006)
www.OakNorton.com

Mr. Chairman, Members of the Committee, it is my great pleasure to be here today and testify to the challenging math problem we face in Utah. There is a solution.

My name is Oak Norton and I am a CPA. I grew up in Pennsylvania and received a wonderful education in math being raised in the shadow of Penn State University. In third grade I was required to memorize the times tables to 12 times 12. Two years ago, my oldest daughter was in third grade and at the end of the year I asked the teacher when they were going to cover the times table. The teacher replied, "it's not part of the curriculum anymore." When I asked how the children were to learn their math facts, this veteran teacher replied, "well, the smart kids will just pick it up as they go."

I have had numerous opportunities to speak with people in the Alpine School District and their reply to these issues is that for people like me, math came easy and they wanted a program to help those that struggle with math. What they can't seem to grasp is that by removing memorization of the basic math facts, they are devastating the mathematical abilities of those they were trying to help. Fuzzy math used in Alpine and other districts in Utah, was condemned by Dr. Wilfred Schmid of Harvard when he said that by 5th grade, students were roughly two years behind their peers (**See Attachment 9 for this quote**). If I had time I could tell you numerous stories about parents who thought their children were doing well in school because they were receiving good grades, but upon examining them, found them lacking in many skills, even years behind, just as Dr. Schmid warned.

Attachments 1 and 2 show one example of a second grade student in Alpine District. This 2nd grader received a 94% "A" on her report card for math, but the parents were concerned and took her to a Sylvan learning center where they tested her on a California standardized exam. The child was rated as a second grade, fourth month level for testing purposes. She scored at a first grade, second month level for computation skills, and a 6-month kindergarten level for concepts and applications (the main reason fuzzy math is supposed to help). She scored 30% correct on her addition facts and 10% on subtraction, yet she was a 94% "A" student. Unfortunately, this type of story is typical. Parents don't know what the problem is until it's too late because their children are bringing home meaningless good grades which parents associate with knowledge, instead of mastery of facts far below their child's grade level.

Homework is worthless in these programs such as second grade assignments to count the number of pockets on parent's clothing and describing a Yekte and what it eats and where it lives. Essays are written by children about their favorite numbers without any meaningful use of those numbers, presuming that thinking about them will produce deeper understanding than actually using them.

My oldest daughter was given the long division problem 120 / 30. She was solving the problem by drawing 120 circles on her paper and crossing them out 30 at a time. When I asked what she was doing and why she wasn't doing it the way we taught her at home, she broke down in tears and said **she wasn't allowed** to do it my way. Another parent that declined for several months to sign my petition, called me up a month ago and asked where to sign when she had this same experience with her daughter who is in an accelerated learning class. Some people never recognize the problem, but by the time some of us do, the damage has been done.

I now have almost 5% of the Alpine school district on a petition to ban fuzzy math from our district (including several math PhD's from BYU) but the local school board still won't listen. The state board won't listen. In their world, **they can't accept the fact that parents know more about their children's educational needs than they as educators and elected officials know**. Every time a charter school opens in Alpine (and there's 4 this year out of 10 in the whole state), it fills to capacity with waiting lists. Parents are sorely disappointed as their children are told they have to go back one or two years in math to catch up. What's happening with fuzzy math is it's destroying the public's confidence in the public school system. No wonder charter and private schools are becoming more popular. Kids need to learn math in math class, not English. It's not just Alpine's problem though, Jordan and other school districts are adopting these programs because the state board has practically endorsed them by telling districts the criterion reference tests will match fuzzy math curriculum standards. Utah's board has lowered the standards so far, these worthless programs can pass the test.

It's not entirely the fault of our state board of education though. They were given a propaganda job and sold on these programs. People here in Utah seem to think they're immune to propaganda jobs by outside organizations. In a year of searching I have yet to find one valid independent study that shows these programs are effective, but to the contrary I have found plentiful evidence both scientific and anecdotal that these programs are doing great harm. **We need an educational Hippocratic oath to first do no harm.**

A month ago, Alpine School District asked me to open mindedly review one study in particular that touted Investigations math. I did. Then I contacted people involved with the study. It turned out that the study was put together, administered, and published by an organization supported by Investigations math. Read the conclusion on **Attachment 3**. This is like accepting Phillip Morris's word that smoking is safe because they've tested it. I challenged the Alpine School Board on January 10th to find me just one valid independent study by the end of January and I'm still waiting. There is no independent support for these programs and after 5 years of classroom use, thousands of children are leaving the system mathematically challenged forever.

The root of these problems is the Utah state math standards. **Attachments 4-6** show a sampling of fourth grade problems from the UTIPS website that **my kindergartener and second grader correctly solved**. Which day had the lowest pizza sales? Pick the lowest number. FOURTH GRADE!!! Something is rotten in Utah and it needs cut out and thrown away. There is no time to lose because we will either spend the money now to fix

the problem, or suffer the economic ravages of a generation of hundreds of thousands of Utahns that can't do higher math. When Utah's standards were created, mathematicians weren't asked to participate because the educational establishment arrogantly thinks they know best how to teach children. What they've done is create a system where we will have no engineers or scientists to attract high-paying jobs in the future.

There is a solution to this problem. California went through 7 years of fuzzy math in the 90's and watched their national scores go from one of the top states in the country, to 2nd lowest (**Attachment 8**). Governor Pete Wilson asked what was going on and the state board wisely got some mathematicians involved and they re-wrote the standards to make them strong and content filled. Fuzzy math couldn't hold up to the standards and was thus banned from California and now California is getting back on track.

Interestingly, a professor at Cal State tracked the schools that dropped Mathland (similar to Investigations) and adopted Saxon math as a replacement. **Attachment 7** shows the incredible improvements at both ends of the economic spectrum simply by switching to a curriculum based on actual research instead of feel good self-esteem nonsense. At the low socio-economic schools (SES), scores tripled and at the upper SES schools, scores increased over 20% in a period of four years. Children develop self-esteem by getting answers right, not being coddled about their strategies to find incorrect answers.

In both California and Michigan, studies showed that remedial math rates doubled for freshmen entering college that came from fuzzy math programs in high school. **(See Attachment 8 for references)**

Studies show that algebra is the number one predictor of college success across ALL majors, scientific or liberal arts (**See Attachment 8**). Pencil and paper mastery of multi-digit and fractional arithmetic in elementary school is an essential factor for success in algebra. Without it, you can't do algebra. Without algebra, you can't be an engineer or scientist and you are less likely to do well in college. Fuzzy math advocates dropping pencil and paper instruction. (**See Attachment 9 for Quote**)

Math is the only truly international language. 2+2 is always 4 everywhere you go because everyone can agree on it. Because of the dire need we face for raising the math bar in Utah, **we need to impose change rather than trying to request those responsible to fix it**. The state board is asleep at the wheel when it comes to math and they've veered off the road toward the cliff side.

This is not as drastic a change as some will portray it to be. It is simply raising the bar asking teachers to give our students more content at earlier ages in order to keep up with the rest of the world. Our children are smart enough to learn. We just need to teach them. Do the right thing and bring Utah to the highest educational standards. **Don't waste time and money reinventing the wheel. California has a fabulous framework, let's use it! Bring it to Utah and lets raise our kids to know how to build a bridge into our future.**

Oak Norton
Testimony to Legislative Committee
February 2, 2006

Additional research and information can be found on my website www.oaknorton.com.

Index to the Attachments

1) Alpine School District Report Card for Student Jane Doe

2) Sylvan Learning Center Scores for Student Jane Doe

3) Conclusion from Tri-State COMAP Study & Sandra Stotsky's Comments

4-6) Sample 4th grade problems from the state UTIPS test bank site

7) Four Year of California Mathematics Progress by Dr. Wayne Bishop

8) California's Drop; References to Remedial Math Studies; Statement on Algebra

9) Selected Statements by Experts Regarding Fuzzy Math

Course	Teacher	T1	T1%	T2	T2%	T3	T3%
Attendance	[redacted]		0		0		0
LA: Composition 2		O	95		0		0
LA: Reading 2		O-	90		0		0
Math 2		O	94		0		0
Science					0		0
Art		O	93		0		0

Grade Scale

Letter Grade:	O	S	N	-	P
Percent:	90%-100%	65%-89%	0%-64%	No Grade	Pass

[redacted]

Shelley Explorers

SYLVAN LEARNING CENTER®
Learning feels good.

Summary of Diagnostic Assessment

Sylvan Math Essentials assessed on 12/07/2005

[redacted]
Current Age: 8 Years 1 Month, Current Grade: 2.4
Report Date: Friday, January 13, 2006

General Assessments

Age When Assessed: 8 years - 0 months

Receptive Vocabulary:
Comprehensive Receptive and Expressive Vocabulary Test

Percentile Rank:	53
Age Equivalent:	8 Years 6 Months
Standard Score:	101 (Average)

Vision Screening: Adequate
Visual Efficiency Rating Apparatus

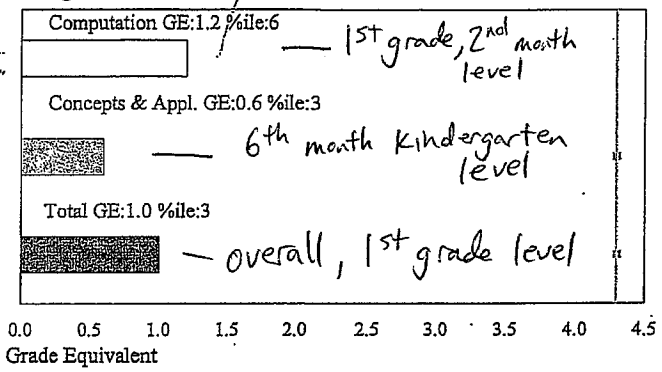
Auditory Screening: Adequate
Wepman Auditory Discrimination Screening

California Achievement Test

CAT/5 Form A - Level 12 Grade Equivalents*

Current grade level

Target Grade: 4.3



Basic Facts Test	% Correct In Time	% Correct Total
Addition	30%	30%
Subtraction	10%	10%
Multiplication 1	0%	100%
Multiplication 2	0%	100%
Division 1	0%	100%
Division 2	0%	100%

Failing

Sylvan Math Essentials Strand

Level		K	1	2	3	4
Numeration	(N)		■	■		
Addition and Subtraction	(A/S)		■	■		
Multiplication and Division	(M/D)			■		
Fractions	(F)			■		
Decimals	(D)					
Integers	(IN)					
Algebraic Reasoning	(AR)			■		
Time and Money	(TM)		■	▒		
Measurement	(M)			■		
Geometry	(GE)	■	■	■		
Area, Perimeter and Volume	(APV)					
Graphing	(GR)		■	■		
Ratio, Proportion and Percent	(RPP)					
Probability and Statistics	(PR)					
Problem Solving	(PS)	■		■		

■ Needs instruction ▒ Pre-assess During Instruction

* SLC administers standardized tests on an individual basis for placement within a Sylvan program. Results reported as grade equivalent are not expected to equal the classroom grade level.

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This is the conclusion from one study Alpine School District relied on to implement Investigations math. The study was created, funded, administered, and published by a group that receives its funding from Investigations math. ***It is fraudulent propaganda*** to deceptively get schools to implement Investigations and other "discovery learning" constructivist style programs.

Conclusion from the Tri-State COMAP study
"...The principal finding of the study is that the students in the NSF-funded reform curricula consistently outperformed the comparison students: All significant differences favored the reform students; no significant difference favored the comparison students. This result held across all tests, all grade levels, and all strands, regardless of SES and racial/ethnic identity. The data from this study show that these curricula improve student performance in all areas of elementary mathematics, including both basic skills and higher-level processes. Use of these curricula results in higher test scores."

http://www.comap.com/elementary/projects/arc/

I contacted **Sandra Stotsky** (the former senior associate commissioner from the Department of Education in Massachusetts during the time this study was done in that state) and asked her about it.

"I am aware of several major problems with the MA part of the study. (1) As the Executive Summary admits, mostly high--income "white" schools were using the "reform" programs in the MA grade 4 sample, (2) no information is given on the supplemental tutoring that exists in these suburban communities (a hard factor to get information on without labor-intensive exploration at each school), (3) no information is given about supplemental curriculum materials the teachers themselves may have used--all we are told is that the schools that were contacted said they fully used the reform program. I know that many teachers in these high-income schools use supplemental materials to make up for the "reform" programs deficiencies, (4) no information is given on the amount of professional development the "reform" teachers had (a huge amount in all probability) in comparison to the teachers in the comparison group (if no new math program, no professional development), (5) no information is given on the amount of time spent on math in the reform schools compared to the comparison group (the "reform" programs require a lot more time per week than most schools had been allotting math for many years. For example, I discovered that one Newton elementary school with top scores was considered a model because it taught math one hour each day!), and probably most important and relevant (6) the MCAS grade 4 math test was originally designed with a great deal of advice from TERC. TERC also shaped the math standards in the 1995 standards document that were being assessed by this test in 2000 (it is acknowledged in the intro to this document). TERC's supporters (and EM supporters) were on the assessment advisory committees that made judgments about the test items and their weights for the math tests. It is well-known that the grade 4 test reflects "constructivist" teaching of math. In other words, the grade 4 test in MA in 2000 favored students using a "reform" program. "

Sample 4th grade problems on the state UTIPS website

This one can be solved by my kindergartener, but Utah feels 4th graders should be tested on it.

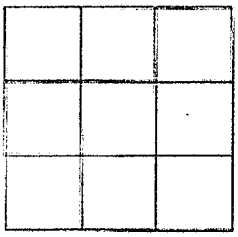
4) The table shows the number of pizzas sold each day for five days.

Day	Pizzas Sold
1	111
2	97
3	74
4	105
5	83

Which day had the lowest number of pizzas sold?

A) 3
B) 5
C) 2
D) 4

7) The figure above is a model of a number sentence.
Which number sentence does this figure represent?



Solved by my Kindergartener

A. $9 + 3 = 12$
B. $3 \times 3 = 9$
C. $3 + 3 = 6$
D. $2 \times 3 = 6$

4th grade problem

Standard 1 Objective 5: Solve whole number problems using addition, subtraction, multiplication, and division in vertical and horizontal notation

Test ID: 521

3 Question(s)

Name:_____ Date:_____

Forced Response

1) Solve the problem above.

$$\begin{array}{r} 96 \\ 17 \\ +\ 22 \\ \hline \end{array}$$

A. 145
B. 135
C. 171
D. 125

2) Solve the problem above.e

$$\begin{array}{r} 705 \\ -\ 215 \\ \hline \end{array}$$

A. 690
B. 490
C. 510
D. 590

3) Which number makes the number sentence true?

$4 \times 2 \times \square = 0$

A. 2
B. 6
C. 0
D. 8

4th grade problems

All solved correctly by my second grader

Four Years of California Mathematics Progress
By Dr. Wayne Bishop

When California implemented their new standards in 1997, Mathland (fuzzy math identical to Investigations math) was removed from the state. A number of schools chose Saxon math as a replacement and **Dr. Bishop monitored standardized test scores for schools that switched from Mathland to Saxon.**

Follow the numbers diagonally to track specific groups' progress from the time of the switch to Saxon. 2nd graders went from 19,29,36,46, to 59th percentile. This is a sample low SES (socio-economic status) school.

Baldwin Park USD SAT-9 Math Ave NPR

Grade	1998	1999	2000	2001	2002
2	19	30	43	48	57
3	22	29	49	53	59
4	23	24	36	45	50
5	25	29	34	46	51
6	38	42	48	52	59

Then a high SES school:

Manhattan Beach USD SAT-9 Math Ave NPR

Grade	1998	1999	2000	2001	2002
2	74	82	89	93	92
3	79	81	87	92	93
4	81	82	82	87	92
5	83	85	88	87	92

A remarkable achievement that at every SES level there were drastic improvements and it was repeated all over the state. A copy of the full study is available at www.OakNorton.com.

California's Drop in Math

Email from Dr. James Milgram (2/1/06), Stanford Math Ph D
"Well, the experiment actually started with the '86 Framework, and the '92 Framework was even more fuzzy. I can't say, exactly where Calif. ranked in '85, but it was still pretty good then, and certainly, in the '70's it was one of the top states, if not the top state in the country. However, **by 1996 it ranked nearly last**. I think District of Columbia was lower and maybe Lousiana was about as bad, but that's where CA ranked."

References to Remedial Math Rate Studies in California & Michigan

California
http://www.mathematicallycorrect.com/elm.htm
Evaluating Entry Level Mathematics Placement in the California State University System
"All students entering the California State University (CSU) system are expected to have completed a rigorous sequence of college preparatory subjects. In mathematics, this means three years of college preparatory course-work, while a fourth year of pre-calculus is recommended. Students who are not exempt on the basis of other test scores must take an Entry Level Mathematics Placement Examination (ELM). If they do not pass this examination, students are required to take remedial course-work. **The failure rate has been steadily increasing over the past several years, and now well above 50% of entering students require remediation.** The CSU system has recently revised the ELM. This report summarizes some of the characteristics of the revised ELM."

Michigan
http://www.math.msu.edu/%7Ehill/HillParker5.pdf
A Study of Core-Plus students attending Michigan State University (High School Fuzzy Math similar to IMP)
Page 8
"The ratios rise to the point where Core-Plus students are taking this remedial course at roughly twice the rate of the Control group students."

Statement on the Importance of Algebra
http://www.mathematicallycorrect.com/lamath.htm
Los Angeles Times Article
Friday, September 17, 1999
L.A.'S MATH PROGRAM JUST DOESN'T ADD UP
By DR. DAVID KLEIN and DR. R. JAMES MILGRAM
"Statistics from the U.S. Department of Education show that success in secondary school algebra is the single greatest predictor of success in college--not just for engineering and science majors, but for majors in all fields."

Expert Statements Regarding Fuzzy Math

Wilfred Schmid, Ph D, Harvard *(Note TERC is Investigations Math)*
"A TERC teacher doesn't explain, and a TERC teacher doesn't teach! I don't want to be misunderstood: group learning and discovery learning are parts of the tool chest of every accomplished teacher, but it is folly to turn these techniques into an ideology. If we mathematicians had to re-discover mathematics on our own, we would not get very far! And indeed, TERC does not get very far. **By the end of fifth grade, TERC students have fallen roughly two years behind where they should be.**"

Wayne Bishop, Ph D, Cal State LA *(Note: IMP is Interactive Math)*
"Although such absolutes are hard to substantiate objectively, it is possible that this is the worst high school mathematics curriculum that has ever been written. The ideologues within the Education and Human Resources division of the NSF, Project 2061 of the AAAS, and the US Department of Education (that deemed both of these curricula "exemplary") notwithstanding, ***districtwide approval of IMP would be nothing short of immoral***. The opportunity of upward mobility through education lost for thousands of children."
...
"If money is available, use it to replace the elementary school curriculum, Everyday Mathematics, that is helping to make your secondary problem worse, not to buy and to train teachers for IMP. **Mathematics is mathematics. IMP is not.**"

(Alpine School District has implemented IMP for grades 10-12 districtwide)

Steven Leinwand, Expert Panel Member of the NSF (a fuzzy math proponent)
"It's time to recognize that, for many students, real mathematical power, on the one hand, and facility with multidigit, pencil-and-paper computational algorithms, on the other, are mutually exclusive. *In fact, it's time to acknowledge that continuing to teach these skills to our students is not only unnecessary, but counterproductive and downright dangerous.*"

David Klein, Ph D, Cal State Northridge (read in light of Mr. Leinwand's quote)
"No single institution in the United States has caused more damage to the mathematical education of children than the National Science Foundation."