TO: Texas Senate Education Committee and Chair Senator Shapiro
Re: SB 4
Date: March 29, 2011
From: Dr. Sandra S. West

I support the portion of SB 4 that appears to raise the certification standards for EC-4 teachers. The science education profession has long advocated raising the standards for certification that currently allows extremely underprepared teachers into Texas classrooms. The Texas Academy of Science and the Texas Science Education Leadership Association have position statements that recommend having standards that better ensure truly "Highly Qualified" teachers who are not only certified, but also competent. The current TExES tests are not sufficiently rigorous to ensure competency. The science education community has testified numerous times to SBEC over the last two decades regarding this problem to no avail. Better prepared teachers were produced when the amount of coursework was **prescribed** than when certification moved to outcomes-based as it is currently. A multiple-choice test is not a valid measure of teacher competency, especially a test that has low level questions and a low passing standard.

TO: Texas Senate Education Committee and Chair Senator Shapiro
Re: SB 1383
Date: March 29, 2011
From: Dr. Sandra S. West

Our research indicates that principals need specific STEM leadership training that will enable them to identify and support effective STEM education. Prior to training the principals focused on general areas or even minutia such as whether the learning objective was written on the board. Indeed, some principals' requirements actually undermine effective STEM instruction or safety. Team collaboration time, not conference time, is necessary for teachers to make those connections among their disciplines and to learn the proper academic language for each discipline. Our PD model, *Mix It Up: Correlated Science & Math* resulted in improved TAKS scores and in a statistically significance increase student performance in mathematics.

TO: Texas Senate Education Committee and Chair Senator Shapiro
Re: SB 6
Date: March 29, 2011
From: Dr. Sandra S. West

The Science Education community strongly urges support for providing science instructional materials. They are not as adequate as a traditional adoption, but science is a dynamic discipline that needs current materials to be effectively taught. So, some is better than none. However, the charge to print is additional expenditure because some items, such as labs must be printed for student use.

TQ "Mix It Up"; Correlated Science and Math
OBSERVATION FORM

Teacher _____ Grade Level _____ Class Size _____ Room Size _____
District _____ School _____ Principal _____
Date of Observation _____ Lesson Topic _____ TQ Topic _____

1. Was the concept appropriate to integrate?

2. If so, was the lesson integrated?

   a. Was each discipline taught conceptually?

   b. Was the Language of each discipline correct?

   c. Was the link between the science and math appropriate/natural?

3. Best Practice instructional strategies are measured on a 3-point scale ranging from being observed 0 (not at all) to 3 (greatest extent) or N/A.

Effective Strategies	0-3	Comments
Enhanced Context (real world, science fair, problem/case based, use tech. to bring in real world, relating learning to students' previous experiences, knowledge or interests, Problem Based Learning, field trips, use schoolyard for lessons, encouraging reflection, hurricanes, global warming)		
Collaborative Learning (arrange students in flexible groups w/ assigned roles to work on various tasks, e.g. conducting lab/field activities, inquiry projects, group science fair projects, discussion, heterogeneous.)		
Questioning (varying time, positioning, or cognitive levels of questions, e.g. increasing wait time, adding pauses at key student-response points, including more high-cognitive-level questions, stopping visual media at key points and asking questions)		
Inquiry (student-centered, inductive instructional activities, e.g. using guided or facilitated inquiry activities, guided discoveries, inductive lab activities, indirect instruction. Using Descriptive, Comparative or Experimental designs.)		
Manipulation (opportunities to work or practice with physical objects, e.g. operating apparatus, developing skills using manipulatives, drawing or constructing something)		
Testing (changes in frequency, purpose, or cognitive levels or evaluation, e.g. providing immediate or explanatory feedback, using diagnostic testing, formative testing, retesting, testing to master)		

Instructional Technology (use tech. to enhance instruction, e.g. using computers, etc. for simulations, modeling abstract concepts, and collecting data, showing videos to emphasize a concept, using pictures, photographs, or diagrams, wikis, pod casts, blogs)		
Enhanced Material (modified instructional materials, e.g. rewriting or annotating text materials, tape recording directions, simplifying lab apparatus to meet student needs)		
Direct Instruction (teach skills, how to use equipment, techniques, etc.)		

4. **Interview with Teacher**

A. Typical science lesson? B. Was the same lesson taught previously? 1. What are some examples of integrated lessons you used in your classroom? 2. How well did it/they work? How did you measure its effectiveness? Will you teach it again? How would you change it to teach again? 3. How many integrated lessons have you &/or your team done this year? 4. If none, then why? 5. How else can we help you integrate science & math? 6. What did your Principal do to help? 7. What, if any, changes this year in your classroom or test scores (individual classroom tests or district benchmarks) or any area can you discern?	
C. Which of those would you attribute to the *Mix It Up* training?	
D. What changes to the science and/or math program have occurred this year?	
E. Which of those would you attribute to the *Mix It Up* training?	
8. What were your overall goals with this teacher this year regarding math or science instruction?	
F. What goals did you accomplish this year concerning math or science instruction?	
G. Of those goals, describe which are ones that you feel were most influential in student success in math or science learning?	
H. What evidence of student learning in science or math do you have for this	

cohort of students (eg how well your students did in 7th grade last year compared to 8th grade this year)?	
I. How has student academic performance increased for this class (eg. Last year 8th grade compared to this year 8th grade)?	
J. To what extent do the disaggregated data show a reduction in achievement gaps in math or science?	
K. What was your biggest challenge in instruction for math and/or science this year?	
L. What was your greatest tool in overcoming that challenge?	
M. What was the most valuable part of the program for you?	
N. How can the program be improved?	

Overcrowding in Science classrooms

More accidents occur when science classrooms are overcrowded.
Science classrooms can be overcrowded in three ways: (1) more than 24 students/class or (2) an inadequate amount of space per student (less than 60sf) and (3) Room Size (more accidents occur in smaller rooms).

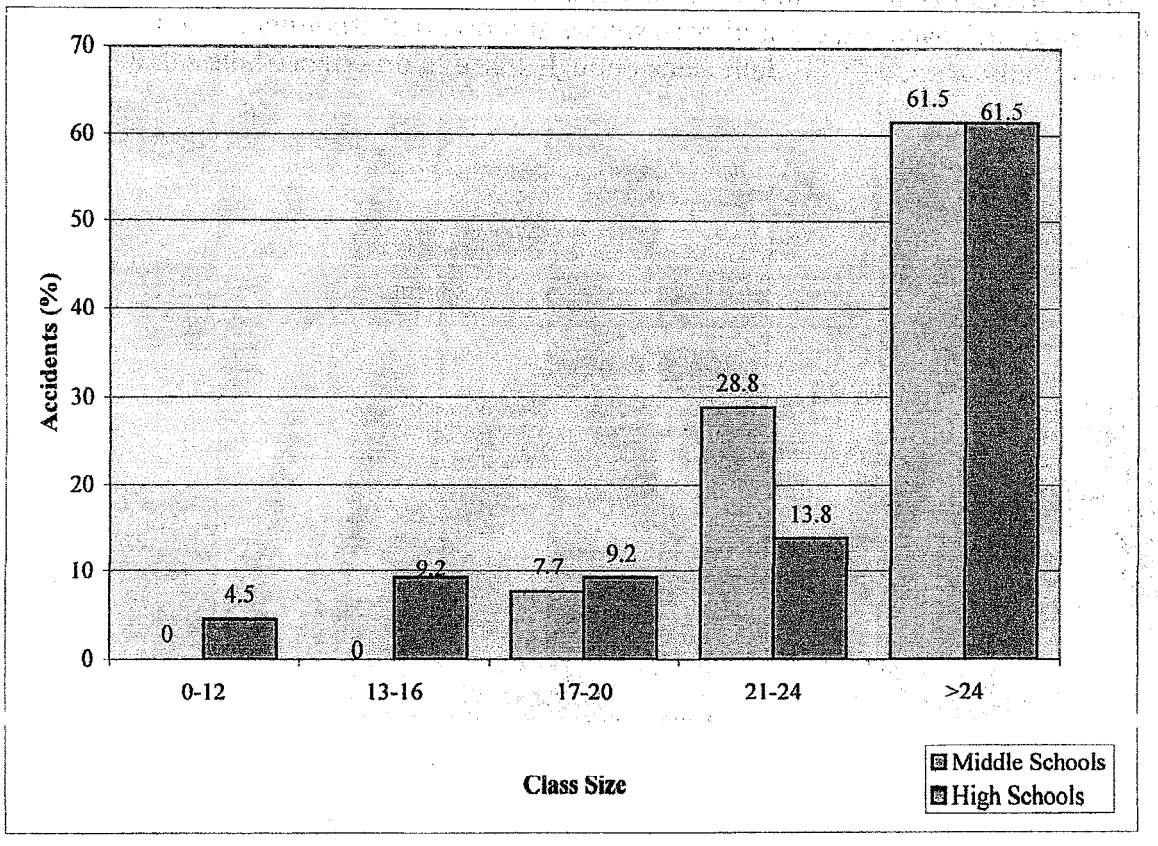
1. CLASS SIZE

More accidents occur in larger science classes doing science activities and the accidents are more serious. This is a supervision issue. A science teacher is unable to safely supervise more than 24 students conducting science investigations using science equipment and chemicals.

Distribution of 140 Lab Accidents by Seriousness & Class Size Per Instructor
(Macomber)

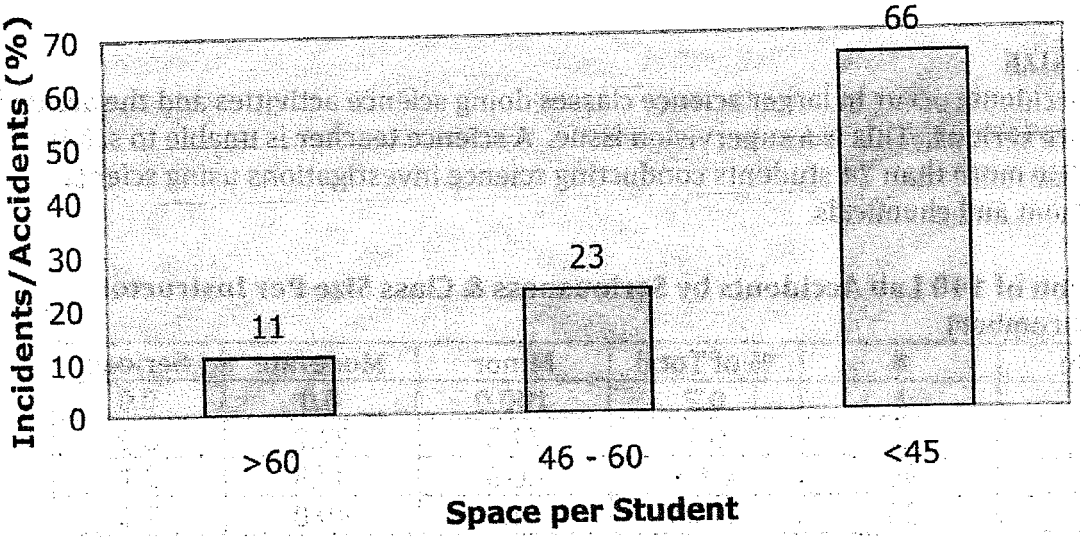
Class size	#	% of Total	Minor	Moderate	Serious
Under 10	1	0.7	100.0	0.0	0.0
11-20	5	6.4	77.8	22.2	0.0
21-30	95	67.9	60.0	37.9	2.1
Over 30	35	25.0	42.9	40.0	7.1

Analysis of 297 Accidents in Texas Secondary Science Classrooms
(Stephenson, West & Westerlund)



2. SPACE/STUDENT

More accidents occur when science students have less space to conduct science investigations. This space could be thought of as "elbow space." (Stephenson, West & Westerlund)



An overcrowded science lab results in two problems:

1. Supervision: Teacher lacks ability to see what individual students are doing
2. Lack of "elbow space": Students lack enough space to do science labs safely