

SENATE STAFF ANALYSIS AND ECONOMIC IMPACT STATEMENT

(This document is based only on the provisions contained in the legislation as of the latest date listed below.)

BILL: SB 292

SPONSOR: Senator Sullivan

SUBJECT: Math & Science Teacher Education

DATE: February 1, 2000

REVISED: 2/22/00 _____

	ANALYST	STAFF DIRECTOR	REFERENCE	ACTION
1.	<u>White</u>	<u>O'Farrell</u>	<u>ED</u>	<u>Fav/1 amendment</u>
2.	_____	_____	<u>FP</u>	_____
3.	_____	_____	_____	_____
4.	_____	_____	_____	_____
5.	_____	_____	_____	_____

I. Summary:

This legislation creates a program to improve the teaching of mathematics and science in Florida, especially in kindergarten through grade 8.

The bill creates sections 231.6015 and 240.149 and amends sections 229.592, 231.600, 236.08106, and 236.685 of the Florida Statutes.

II. Present Situation:

Florida has long acknowledged the need to improve student achievement in mathematics and science. Only recently has that acknowledgment focused its sights so clearly on teacher preparation and student assessment.

In 1989, the Florida Department of Education published *A Comprehensive Plan: Improving Mathematics, Science, and Computer Education in Florida*. That report recommended strong action to:

1. Strengthen Curriculum
2. Revitalize Learning
3. Prepare more Qualified Teachers
4. Reach out to Students with Special Needs, and
5. Get Results: Adjust the Statewide Testing Program

In the 11 years since that report was published, Florida has received nationwide recognition for its achievements to revitalize learning through technology and to strengthen curriculum through the recently adopted Sunshine State Standards and the proposed Subject/Content Standards for Teachers. A statewide testing program, the Florida Comprehensive Assessment Test or FCAT, has been implemented statewide and will soon be conducted in every grade after grade 3. However, reports based on research still regularly identify the other areas as lacking in Florida -- especially teacher qualifications and special needs students.

SPECIAL NEEDS STUDENTS

When the results of the 1996 National Assessment of Educational Progress (NAEP) were linked with those of the Third International Mathematics and Science Study (TIMSS), Florida’s children measured lower than those in the United States average for all grades, and the gap widened in the upper grade levels. In mathematics, 45 percent of Florida’s 4th grade students are below basic (lowest) achievement levels, compared to 39 percent nationwide. On international comparisons, achievement of students in the United States was high in grade 4, below average in grade 8, and almost last by grade 12. The results are more alarming when broken down by race (see Table 1). Although a total of 21 percent of Florida’s eighth graders scored “Proficient” in science, only 4 percent of African American students and 9 percent of Hispanic students did that well. Other research points to the relationship between these low scores and teacher preparation: In schools with the highest minority enrollments, students have less than a 50 percent chance of getting a science or mathematics teacher who is certified to teach science or math.¹

Table 1: 1996 NAEP* Test in Science: Grade 8 Students who Scored “Proficient” or Better				
	All	White	Black	Hispanic
United States	29 percent	37 percent	5 percent	11 percent
Florida	21 percent	32 percent	4 percent	9 percent

*NAEP is a national program that has tested a sample of students periodically since 1969. Its purpose is not to assess every student but to provide a national report card.

FCAT (Florida Comprehensive Assessment Test)

The 1998-1999 school year was the second year all public school students took a statewide assessment test. The FCAT test questions and performance tasks are written to measure the Sunshine State Standards benchmarks in reading for grades 4, 8 and 10 and mathematics for grades 5, 8 and 10. The Sunshine State Standards are a statewide consensus of what Floridians believe their children should know and be able to do at each stage of their education. As required by ch. 99-398, L.O.F., the *A-plus Education Plan*, all students in grades 3-10 will be tested in reading, mathematics, and writing. Beginning in 2003, a science component will be added to the test.

TEACHER QUALIFICATIONS

The connection between teacher qualifications and student learning is a popular topic of recent research. Recent studies focus on the level of courses teachers took in the content area and on the proficiency of the teacher in advanced courses. The number of courses is less important than whether they were advanced. These studies show a clear link between the teachers’ preparation, the ways teachers manage the classroom, and the achievement of their students as measured by scores on tests.²

¹J. Oakes, *Multiplying Inequalities: The Effects of Race, Social Class, and Tracking on Opportunities to Learn Mathematics and Science*, RAND Corporation, 1990.

²For example, see: Chaney, B. 1995. *Student Outcomes and the Professional Preparation of Eighth Grade Teachers in Science and Mathematics* and Carlsen, W.S.1991 *The Construction of Subject Matter Knowledge in Primary Science Teaching*.

Florida's requirements for teacher preparation programs in approved colleges of education are as rigorous as those of most other states. Since the so-called "Gordon Rule"³ in 1982, colleges of education must concentrate on content over pedagogy. Florida also imposes comparatively strong requirements for certification. But Florida allows over 14,000 teachers to work with temporary certificates, and many if not most of Florida's teachers were educated in other states.

These facts elevate the need for professional development programs for teachers already employed in Florida's classrooms. At the state level, Florida has a comparatively strong policy framework for professional development and a sound fiscal commitment, but without much evidence of success.

Many indicators point out that professional development may be a low priority among local school districts. The 1997 Department of Education study of staff development⁴ found a contrast between the state policy and local implementation. Although the policy and framework of support exist, in practice, staff development:

- is not supported by local funds,
- is not built into school schedules,
- does not conform to student needs, and
- lacks focus: "workshops are at an awareness level only and do not provide for substantive changes in curriculum, instruction, or technology."

That report also concluded that the effect of staff development on student achievement is "virtually unstudied."

An interim study report on teacher effectiveness by the Senate Education Committee (Interim Project Report 2000-30) found little evidence of improvement in professional development activities pursued by school districts. On a survey, 23 of 48 responding school districts reported that they require teachers to attend professional development activities, but the definition of these activities varied so much that analysis is misleading. For instance, one reported nine days of required professional development. When called to explain, the administrator clarified that only one hour is required on each of nine days. The maximum required by any district is 5 days. Eight districts require 2 days, four require 3 days, and six require 4 days. Often the days reported are during pre-planning and post-planning periods.

A key provision in the 1999 Appropriations Act requires principals to take an active role in selecting professional development activities for the school's teachers. Another provision in Florida's new accountability law, the *A-plus Plan*, requires a review of the performance evaluations of teachers in failing schools and intervention if any of them need improvements in general knowledge or basic skills.

Professional Development: Mathematics and Science

According to data provided by the Division of Public Schools in the Department of Education, mathematics and science professional development is provided through three employees of the

³Rule 6A-10.030, F.A.C., named for Senator Jack Gordon.

⁴Florida Department of Education. *The 1997 Staff Development Evaluation Study*, presented by Frank T. Brogan Commissioner, September 30, 1997.

department and through federal Eisenhower Title II funds paid to local school districts. Until recently, approximately \$11 million provided through that federal program were earmarked for science, mathematics, and technology, but the funds are no longer restricted. Programs are available through a network of six area Teacher Education Centers.

In summer of 1998, the National Alliance of State Science and Mathematics Coalitions convened a national group to discuss the need for improvements and to recommend action for states to take. The Florida contingent of that group is named "Coalition for Improving Mathematics and Science in Florida." Their major recommendations were to:

- Focus professional development through a statewide assessment;
- Coordinate the state's efforts through a nongovernmental organization with considerable autonomy to define, implement, and evaluate a statewide plan;
- Use improvement in student performance to evaluate the program's success.

III. Effect of Proposed Changes:

The legislation under consideration will place into law the findings and recommendations of the Coalition for Improving Mathematics and Science in Florida. The following section by section analysis is a summary of those initiatives:

Section 1. (Creates s. 231.6015, F.S.)

Creates a grant program to fund in-service professional development activities to improve mathematics and science teaching, with an initial emphasis on kindergarten through grade 8. A school district may not divert funds provided for this program to supplant current activities.

The program has a specific description to require a focus on content sequences aligned with the state-adopted Sunshine State Standards and the content standards developed for teachers by the Education Standards Commission. The bill specifies that the program is supposed to be intensive enough to improve a teacher's command of content knowledge and teaching skills.

If the program funds are insufficient to reach all teachers, it must allocate resources to produce a measurable change in the ones it does reach. This provision appears to counter a familiar criticism that professional development is spread too thin -- "A mile wide and an inch deep."

The program's evaluation must include a component that measures student achievement. The evaluation will be designed by the Alliance to Improve Mathematics and Science, which is created in section 2 of the bill.

The bill states that teachers may be compensated for their participation and may use successful participation to extend their certificates or add a new certification area. Section 5 of the bill authorizes a salary bonus to teachers who successfully complete the program, and this section stipulates that the program's design must define conditions under which the bonus is earned.

Delivery sites for the program are defined as joint-use facilities and may be on property belonging to a school district, a public or independent university, college, or community college.

The bill requires the program to involve the expertise of contemporary research and higher education institutions. However, a community college or university whose professors provide instruction for the program may report full-time-equivalent students for state funding only if the institution provides the instruction “in-load” by its own staff paid by its own resources. The term “in-load” means that the professor performs the instruction as part of his or her regular teaching duties (or teaching “load”) as assigned by the institution.

The Legislature will determine in an appropriations act the extent of the program and the number of delivery sites.

Section 2. (Creates s. 240.149, F.S.)

This section creates a quasi-autonomous nongovernmental organization called the Alliance for Improving Mathematics and Science (AIMS). The organization will be operated by a board of directors and must be registered and incorporated as a not-for-profit organization under chapter 617, F.S., and section 501(c)(3) of the Internal Revenue Code.

Although independent of state government, the organization is subject to the state’s sunshine laws and is assigned to the Office of the Commissioner of Education for administrative purposes. Such an assignment is to provide a fiscal agent for a nongovernmental group to receive state funds. The arrangement gives the department no authority over the decisions of the alliance, nor any credit or blame for its accomplishments or failures.

The board of directors is appointed by the Commissioner of Education from recommendations requested from any public or private organizations with expertise in education or technology. Three of those organizations are mentioned in the bill: The Postsecondary Education Planning Commission, the Education Standards Commission, and the Jobs and Education Partnership of Enterprise Florida (called in statute the Workforce Development Board).

The board must include:

- Four employees of postsecondary education institutions who have expertise in science and science education, mathematics or mathematics education, or a related technical field.
- Four members who are employees of school boards. Two of these members must be teachers.
- Four members from the private sector.
- One member to represent the Department of Education. This member does not have a vote, although he or she may participate in the alliance’s deliberations.

The board will have a chief executive officer who may employ staff.

An advisory council is created to assist the organization and to apprise decision makers of its activities. The council has six members:

- One member of the Florida Senate,
- One member of the Florida House of Representatives,
- A representative of the Executive Office of the Governor,
- A representative of the Department of Education,
- A representative of the community college system, and
- A representative of the state university system.

The bill does not specify responsibilities of the council; presumably it will act as an oversight group to gather and disseminate information about the alliance's accomplishments, to give it visibility, and to penetrate governmental barriers when advisable.

The bill specifies guidelines about the program to be delivered. The guidelines again emphasize focus, concentration on content, and specific sequences designed around the Florida Comprehensive Assessment Test, the Sunshine State Standards, and the content standards for teachers.

The guidelines require the alliance to design the selection process for teachers who will participate, to provide for staff to implement the program's workshops, and to design the follow-up support for each teacher for at least a year in the classroom. The alliance either could conduct a centralized operation or could contract with personnel in each district. But the bill gives the responsibility to the alliance and does not authorize it to operate as a "funding stream" by delegating authority to each district.

By December 1, 2000, the board submits a budget proposal for 2001-2004. The proposal is to go to the Legislature through the Commissioner of Education and must include alternatives for providing the program to all, half, or a quarter of the state's elementary and middle school teachers. The implication of this funding procedure is that the program should be implemented fully to the number of teachers involved, not that it should be spread out among so many teachers as to reduce its ability to effect a change.

Section 3. (Amends s. 229.592, F.S.)

This section requires the State Board of Education to require each school to report the number and percentage of teachers who have successfully completed the program to improve mathematics and science teaching.

Section 4. (Amends s. 231.600, F.S.)

This section assigns to the teacher education centers the responsibility to assure that teacher education programs will be fully aligned with the content of science tasks included in the FCAT beginning in 2003. This provision requires each teacher at least to know the skills that will be included in the FCAT, whether or not the program designed by the Alliance to Improve Science and Mathematics reaches every teacher in a district.

Section 5. (Amends s. 236.08106, F.S.)

This section authorizes a salary bonus to teachers who successfully complete the program to improve the teaching of mathematics and science. The Alliance to Improve Mathematics and Science will adopt criteria to define "successful completion," but the bill requires those criteria to include improvement in student achievement.

Section 6. (Amends s. 236.685, F.S.)

This section requires the annual report for education funding accountability to include the number and percentage of teachers who have completed the program to improve mathematics and science.

Section 7.

Provides an effective date of July 1, 2000.

IV. Constitutional Issues:

A. Municipality/County Mandates Restrictions:

None.

B. Public Records/Open Meetings Issues:

None.

C. Trust Funds Restrictions:

None.

V. Economic Impact and Fiscal Note:

A. Tax/Fee Issues:

None.

B. Private Sector Impact:

None.

C. Government Sector Impact:

The Department of Education has estimated the start up costs for the Alliance, Chief Executive Officer, staff and council at \$35,000, and the operating costs at \$138,000. Operating costs are recurring and include salaries, office expenses, and travel for board and council members.

According to a proposal by the Coalition for Improving Mathematics and Science, the program itself will cost about \$1,800 per teacher. To reach 8.2 percent of Florida's elementary school teachers, or 4,500 teachers annually, it would cost \$3.52 million in the first year and almost \$8 million annually thereafter. This number reflects the cost to the state; school districts would be expected to cover the costs for providing substitute teachers or teacher stipends if additional days are added to the teacher's contract.

The Department of Education provided the following estimate for paying teacher stipends for 1 day of training. The estimates for year 2 and year 3 reflect an assumption that teachers who had received training in the first year would not receive training in the next 2 years, that the teachers' salaries would increase by 3 percent each year, and that the number of teachers would increase 1 percent each year.

	Amt Yr 1 (FY00-01)	Amt Yr 2 (FY01-02)	Amt Yr 3 (FY02-03)
Cost to school districts for 1 day of training for:			
100 percent of teachers - grades K-8	\$20,391,397	\$210,031	\$218,496
50 percent of teachers - grades K-8	10,195,699	105,016	109,248
33 percent of teachers - grades K-8	6,729,161	69,310	72,104
25 percent of teachers - grades K-8	5,097,849	52,508	54,624

VI. Technical Deficiencies:

None.

VII. Related Issues:

The 1999-2000 General Appropriations Act directed school districts to focus inservice professional development programs on subject content and teaching methods, including technology, related to the Sunshine State Standards. This provision includes reading and language arts as well as mathematics and Science.

The Department of Education’s Legislative Budget Request for 2000-2001 includes a \$7 million appropriation for a program similar to the one created by the bill.

VIII. Amendments:

#1 by Education:

Deletes restrictions on science centers that may be selected to participate in the planning and delivery of the professional development program. To be eligible, a science center will not require accreditation by the American Association of Museums, nor must it be a full member of the Association of Science and Technology Centers.