



The California Algebra Forum II

A Continuing Focus on Algebra Research

October 13, 2008

State Vision

Phil Lafontaine, Director
Professional Development and Curriculum Support Division
California Department of Education

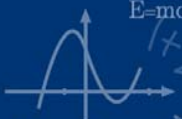
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Content Standards
for California
Public Schools
Kindergarten Through
Grade Twelve



Mathematics Framework
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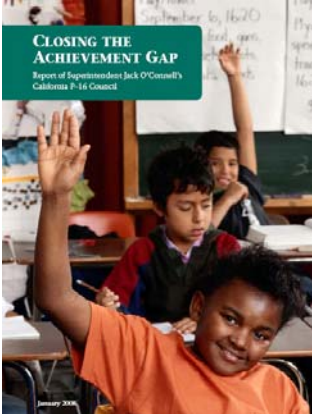
$$E=mc^2$$



$$x+2=3$$

$$8 + () = 13$$

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CALIFORNIA DEPARTMENT OF EDUCATION
Jack O'Connell, State Superintendent of Public Instruction



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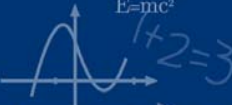
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Coherence

co-her-ence [koh-heer-uh ns]

1. logical interconnection; overall sense or understandability.
2. congruity; consistency.



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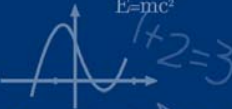
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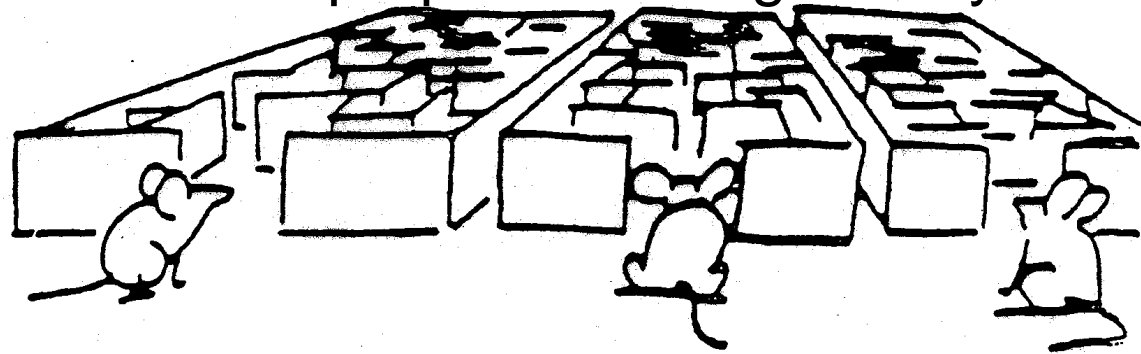
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Students prepared for Algebra by Grade 8



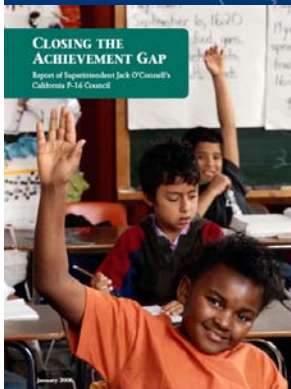
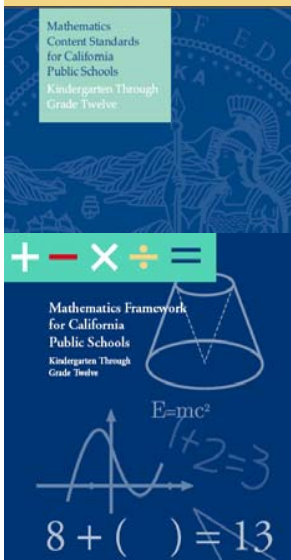
State

Regional

Local



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State Board of Education – July 9, 2008

“The State Board of Education (SBE) directs SBE and California Department of Education staff to work with the U.S. Department of Education to develop a compliance agreement whereby the Algebra 1 end of course exam becomes the sole test of record for federal accountability purposes under the No Child Left Behind Act for eighth grade mathematics.”



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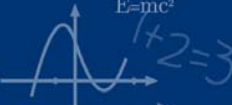
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California Mathematics Framework

“A goal of this framework is to prepare all students to study algebra by the eighth grade. In 2000 legislation was enacted requiring students to complete Algebra I as a condition of receiving a high school diploma (*Education Code Section 51224.5(b)*).”



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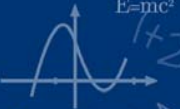
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California Mathematics Framework

“The evaluation criteria for grade-level mathematics programs requires alignment with the appropriate grade-level content standards for kindergarten through grade seven and the Algebra I standards for grade eight.”



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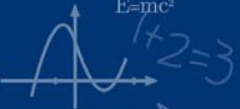
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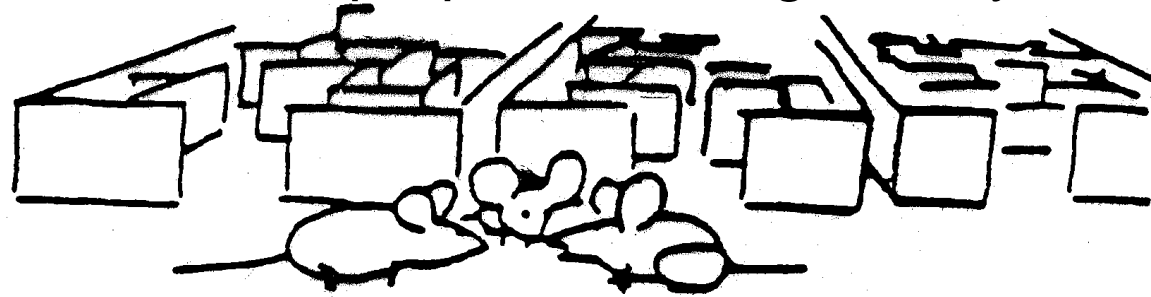
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Students prepared for Algebra by Grade 8





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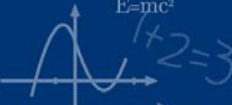
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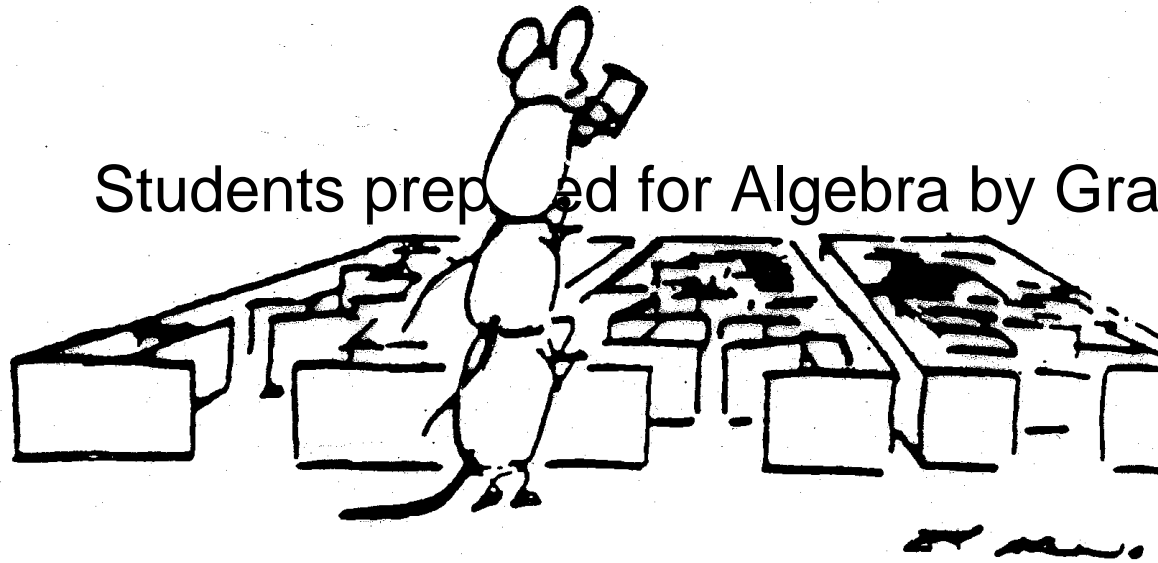
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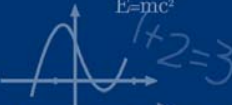
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California Mathematics Standards

“A high-quality mathematics program is essential for all students and provides every student with the opportunity to choose among the full range of future career paths. Mathematics, when taught well, is a subject of beauty and elegance, exciting in its logic and coherence. It trains the mind to be analytic—providing the foundation for intelligent and precise thinking.”



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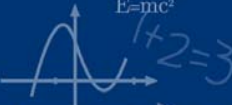
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California Mathematics Standards (1997)

“The standards emphasize computational and procedural skills, conceptual understanding, and problem solving. These three components of mathematics instruction and learning are not separate from each other; instead, they are intertwined and mutually reinforcing.”



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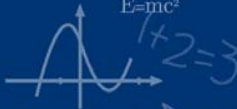
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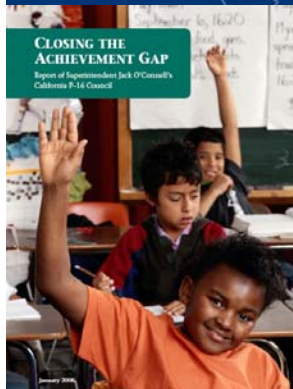
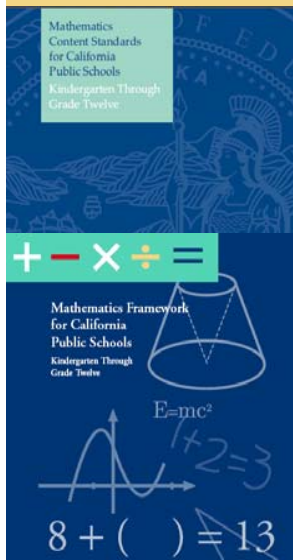


National Mathematics Advisory Panel (NMP) - 2008

“To prepare students for algebra, the curriculum must simultaneously develop conceptual understanding, computational fluency, factual knowledge and problem solving. These capabilities are mutually supportive, each facilitating learning of the others.”



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California Mathematics Standards

“To allow local educational agencies and teachers flexibility in teaching the material, the standards for grades eight through twelve do not mandate that a particular discipline be initiated and completed in a single grade. The core content of these subjects must be covered; students are expected to achieve the standards however these subjects are sequenced.”



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Mathematics Content Standards for California Public Schools Kindergarten Through Grade Twelve

Mathematics Framework for California Public Schools Kindergarten Through Grade Twelve

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California Mathematics Standards

Table 1

Mathematics Disciplines, by Grade Level

Discipline	Grades				
	Eight	Nine	Ten	Eleven	Twelve
Algebra I					
Geometry					
Algebra II					
Probability and Statistics					
Trigonometry					
Linear Algebra					
Mathematical Analysis					
Advanced Placement Probability and Statistics					
Calculus					



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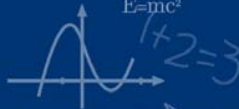
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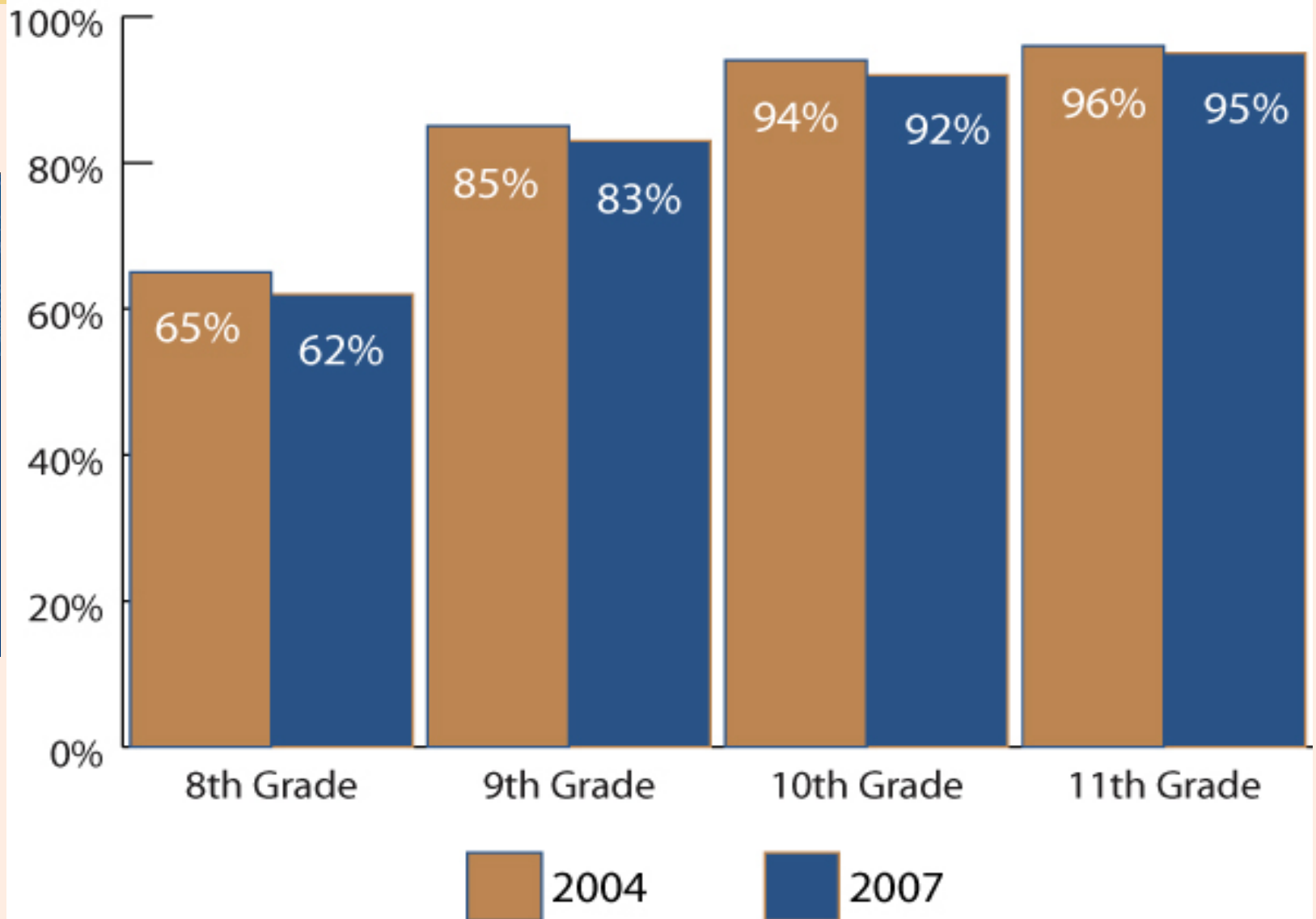


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Percentage of Students Below Proficient on Algebra I CST





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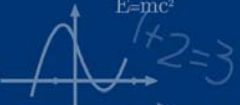
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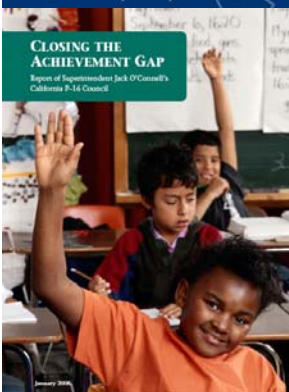
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Quality Mathematics Instruction

- The problem of mathematics achievement is primarily contained between the teacher and the students.
- Mathematics education is mainly a product of schooled learning.
- Mathematics knowledge is cumulative in its effects.
- Algebra achievement sits on top of eight years of schooling.
- Every year matters.



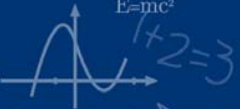
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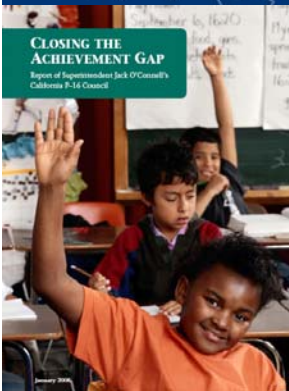
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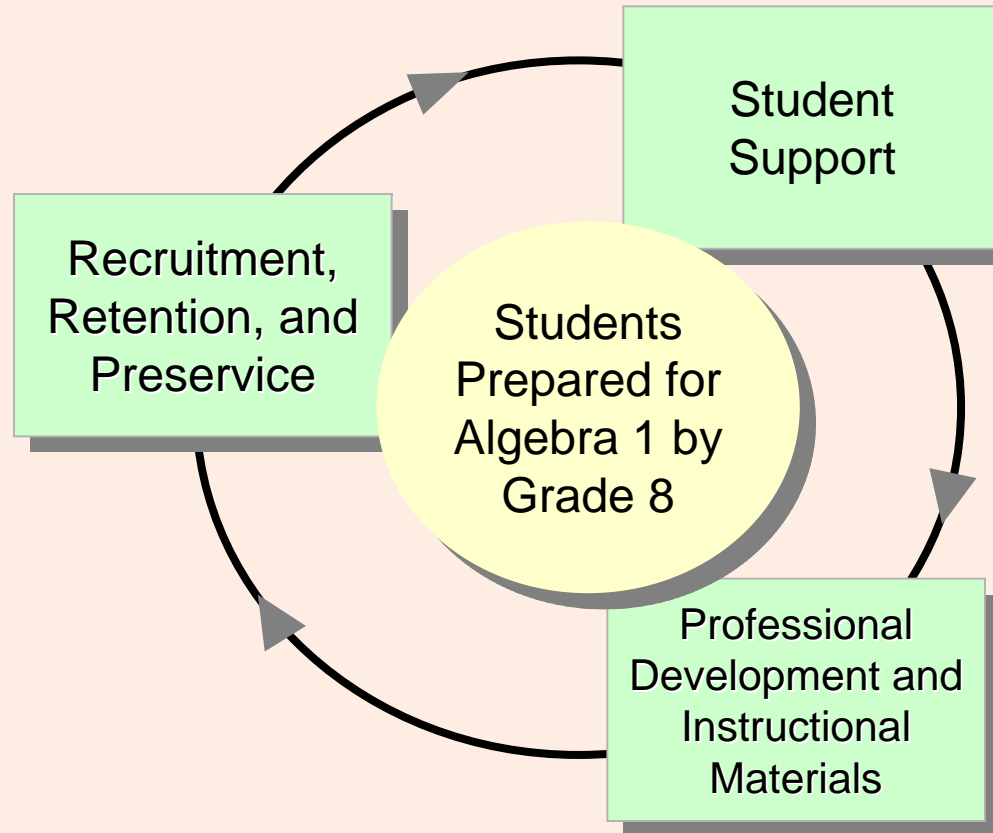
$2+3=5$

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California's Algebra 1 Success Initiative





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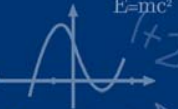
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Student Support

- Increase instructional time for middle grades
- Morgan-Hart Class Size Reduction for grades 7 & 8
- School counseling services in grades 4 - 8
- STEM in grades 4 - 8
- After school programs funded by Prop 49
- Algebra Summer Bridge programs
- Advancement Via Individual Determination
- Mathematics Engineering Science Achievement
- Support for migrant students
- Availability of trained classroom tutors

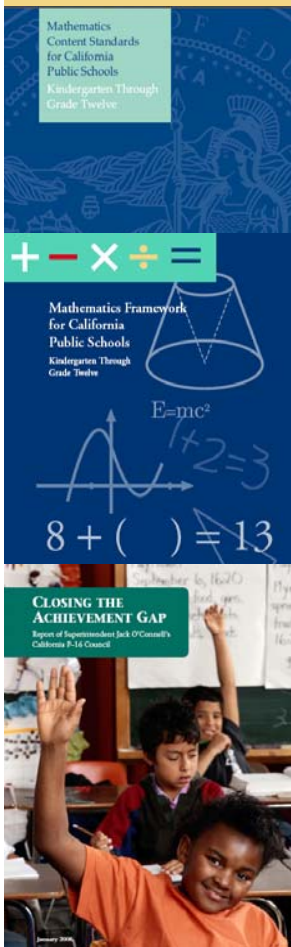


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Student Learning Concerns

National Mathematics Panel

- Children from families with low incomes, low levels of parental education, and single parents often have less mathematical knowledge when they begin school than children from more advantaged background.
- Children's goals and beliefs about learning are related to their mathematical performance.





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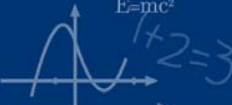
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Professional Development & Instructional Materials

- Instructional Materials Funding Realignment Program
- Focused and comprehensive algebra professional development plan
- California Mathematics and Science Partnership program
- Business and Labor Assisting Students and Teachers program
- Partnerships between education and mathematics-intensive industries
- Math-in-career technical education program
- California Algebra Forum
- Expedite the process for credentialing **qualified** candidates



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Instructional Materials Concerns

National Mathematics Panel

- Extreme length of textbooks not necessary for effective instruction.
- California mathematics textbooks are 200-250 pages shorter than national textbooks.
- Reduced **coherence** of presentation of content in textbooks.

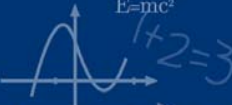
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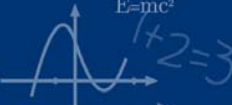
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Recruitment, Retention, and Preservice

- Incentives to recruit and retain of Highly Qualified math teachers
- Mathematics teacher training programs without losing quality
- Teacher recruitment programs for existing and retired mathematics professionals
- *Become a Mathematics Teacher* program
- Early identification of potential mathematics teacher candidates
- Hiring of qualified multinational teachers with mathematics expertise



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Recruitment, Retention & Preservice National Mathematics Panel

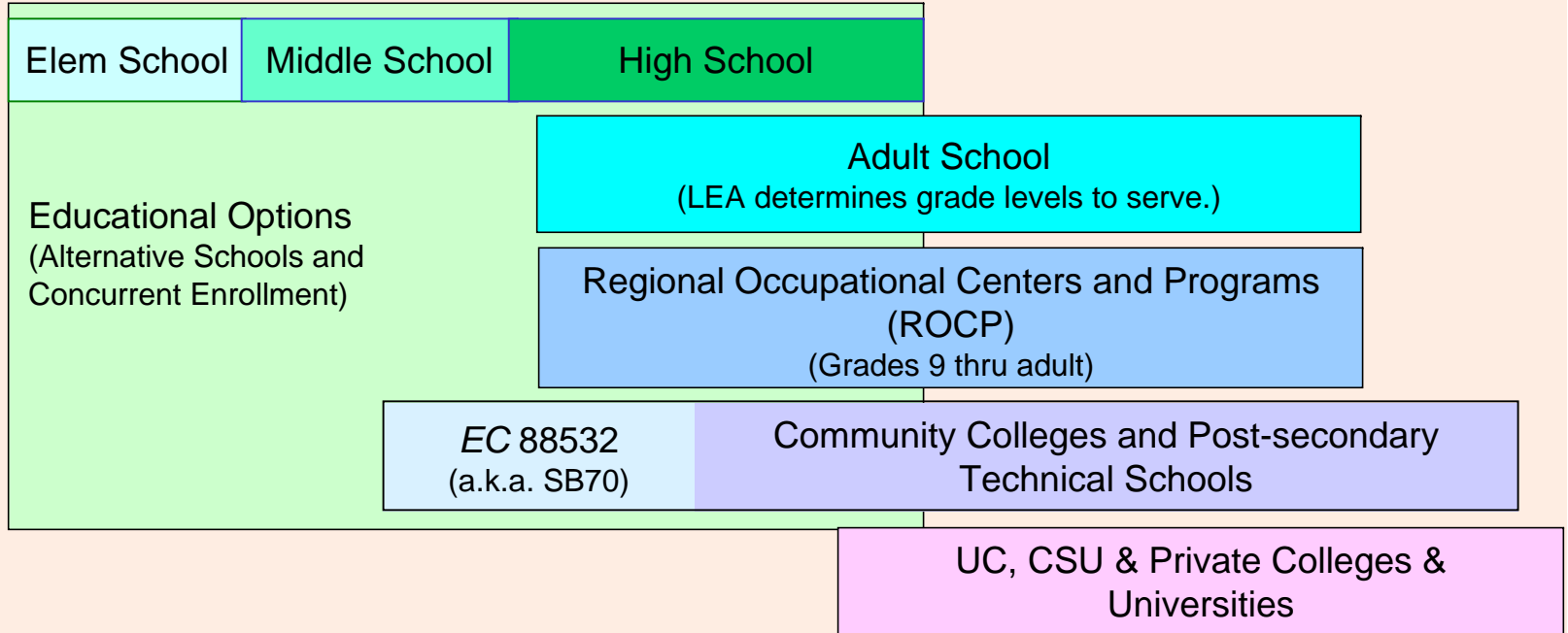
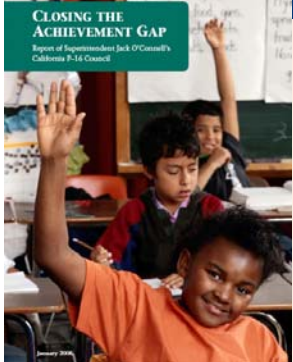
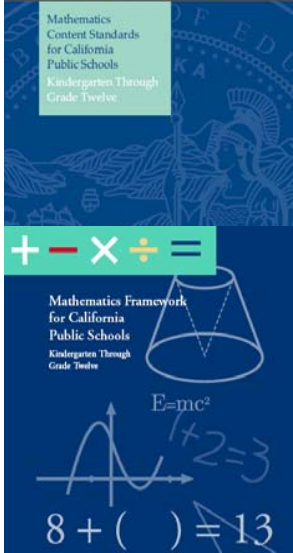
- Research has **not** provided consistent or convincing evidence that students of teachers who are certified in mathematics gain more than those whose teachers are not.
- The level of teachers' mathematics course work **may** predict student achievement at the high school level, but not below the ninth grade.



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California's Education System

All Involved in Contributing to Success in Mathematics



Questions to consider:

- What funding is available to make this happen?
- Who is authorized (credentialed/qualified) to provide service/instruction at which setting(s)?
- Who administers, manages, and monitors the funds and services?
- How are these efforts coordinated, integrated, or differentiated?



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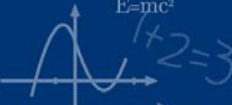
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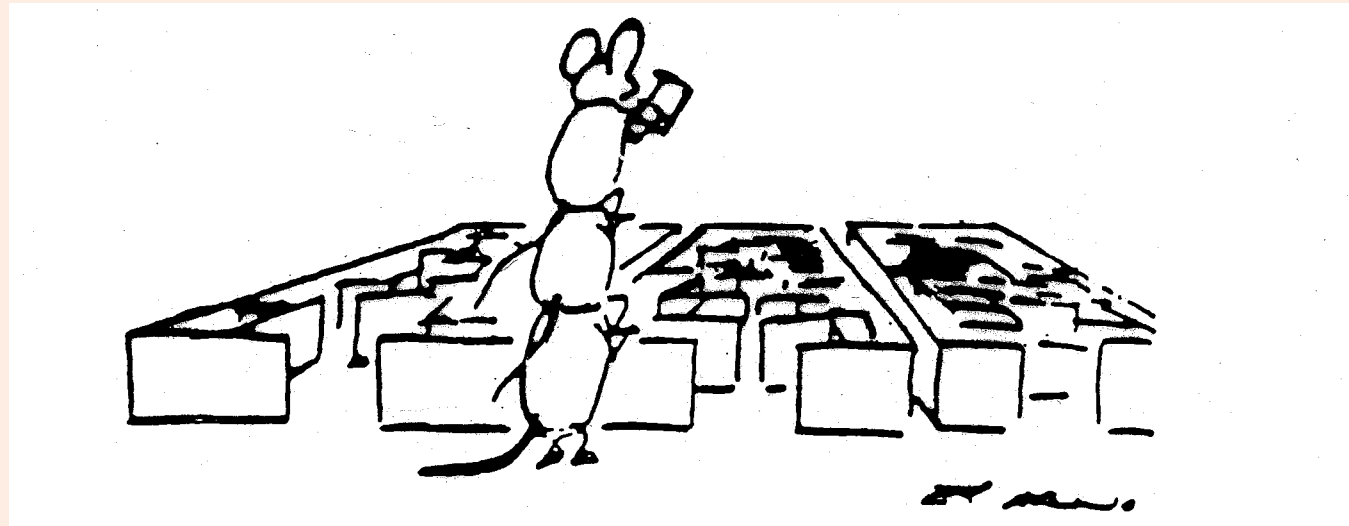
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CDE Internal Coordination and Coherence

- Algebra Task Forces
 - Limited term office within CDE
 - Proposed CDE internal and external group
- Mathematics Discussion Group





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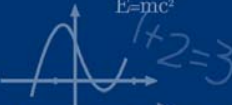
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Now What...

We do not have all the answers to helping you prepare for having all students in grade 8 take the CST Algebra 1 end of course exam.

We do not have all the questions.



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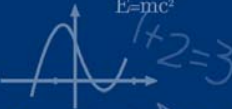
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Here is what we are asking of you.

1. Regionally and locally what are you doing to bring coherence and a common understanding to preK-16 mathematics education?
2. Aside from funding, what will it take regionally and locally to have students prepared for Algebra 1 by grade 8?
3. What questions do you have for the California Department of Education?



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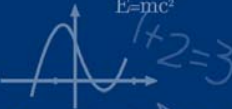
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Here is a brief quiz

1. Which country is credited with creating the decimal system?
2. Why is Aryabhata important to mathematics?
3. Who was Srinivasa Ramanujam?



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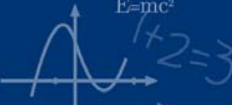
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