

FAX

DATE: 8/24/97

Number of pages including cover 3

TO: *Mike Cohen/Bill Kincaid*
Domestic Policy Council

Phone

Fax Phone 6-7028

FROM: *Dr. Daryl Chubin*
OSTP/EOP
Assistant Director for
Social and Behavioral
Sciences (and Education)

Phone 202/456-6130 (main)
456-6129 (Daryl direct)

Fax Phone 202/456-6027

CC:

REMARKS: ☐ Urgent ☒ For your review ☐ Reply ASAP ☐ Please Comment

Mike/Bill:

Here is the letter from PCAST Education Panel Chair David Hamburg to Secretary Riley commenting on the Working Group August 6 draft report. An identical letter has been sent to Director Lane (and faxed to Judy S.).

How the Working Group uses the letter is entirely their call. It is provided at least to help them prepare for the joint appearance of Neal and Mike S. at the September 29 meeting with the full PCAST (10 am, WH Conference Center). It may be helpful in revising the document or to influence post-report actions that might best be conveyed in the transmittal letter accompanying the report. (Only members of the Education Panel have seen the draft report.)

I depart for a late vacation this Saturday, Sept. 27, but *will* be available tomorrow and Friday if you want to talk.

Thanks,



EXECUTIVE OFFICE OF THE PRESIDENT
PRESIDENT'S COMMITTEE OF ADVISORS ON SCIENCE AND TECHNOLOGY
WASHINGTON, D.C. 20502

September 23, 1997

The Honorable Richard W. Riley
Secretary
United States Department of Education
400 Maryland Avenue, S.W.
Room 4181
Washington, DC 20202

Dear Dick:

The President's Committee of Advisors on Science and Technology (PCAST) Education Panel, which I chair, had a meeting on September 2, 1997. At that time we discussed a number of issues preparatory to our PCAST meeting at the end of the month. The draft ED - NSF Working Group Report on Math and Science Education, in response to the President's March 1997 directive, had been received by the panel members and we found it of great interest. Clearly, this is a constructive, farsighted initiative. The panel had several concerns that could usefully be addressed in further work on the initiative.

1. Concern about a decoupling of science and mathematics education in the draft. While the President's interest in a national 8th grade test in mathematics provided much of the impetus for the working group and the report, PCAST panel members were concerned about the absence of any substantive comments about science education in the report. The intimate relationship of science and mathematics education is acknowledged in the name of the group and the charge to it but not yet reflected in the draft.
2. Concern about the lack of a clearly articulated role for each agency and for a clear signal of areas of overlap in which cooperation might occur. Both the Department of Education and the NSF have signaled their support for high standards for all students and their concern about improving the achievement levels for poor and minority students. Yet there is little clear language about the mechanisms for cooperation across programs that will enable these goals to be reached, such as the articulation between NSF's Urban Systemic Initiatives and ED's Title I programs. In fact, most of the federal money available for mathematics improvement is in Title I, but no goals are stated that would provide direction and assistance toward standards-based efforts.
3. Concern about the separateness of the ED and NSF efforts conveyed in the document. There is little in the document to suggest cooperation (past, present or future) across the two agencies in general. This reads as though efforts are on parallel tracks that do not converge. We urge whatever actions are necessary from the leadership of the agencies to improve working interactions and foster cooperative efforts at all levels.

4. Concern about problems associated with assessment. Regardless of the outcome of the current debates on a mathematics test, we need to invest in R&D related to assessment technologies. We need to learn how to develop tests aligned to standards. We also need to develop comprehensive frameworks that link standards, assessment, professional development, teacher preparation, pedagogy, and appropriate incorporation of technology at national and local levels. In the same way that the PCAST Panel on Technology in Education emphasized the elements that must surround hardware and software, frameworks must be developed that focus on those issues that surround assessment. This vision is not yet present in the document.

This need to develop a comprehensive vision also suggests a place for joint initiative in the area of teacher professional development. Aligning existing resources and efforts, with each agency involving its closest constituencies around a common vision, has the potential for big payoff. There is the opportunity for a shared focus on teacher preparation and continuing education and re-invention of the role of the university in this regard.

Perhaps by working together, ED and NSF can help communicate to the public and the Congress the new realities of the workplace, how much more our children will have to know and be able to do for the U.S. to remain competitive in a global marketplace. Perhaps together we can communicate that education and training are top-priority national issues, and make clear the need for high standards for all in mathematics and science education.

In its present form the draft report is not yet fully responsive to the President's directive. We stand ready to assist you in any way we can to develop a report that moves us toward our shared goals of enabling our children to live, work, and prosper in the 21st century.

Sincerely,



David Hamburg

cc: Neal Lane
Dr. John H. Gibbons
PCAST Education Panel Members



Judy_Wurtzel @ ed.gov
09/28/97 05:42:00 PM

Record Type: Record

To: Thomas A. Kalil, William R. Kincaid

cc:

Subject: Re[3]: Ask Dr. Math

Henry--

As with many good ideas, several different folks get them at the same time and work on versions of them at the same time. There a couple of things in the works that I know of -- the Virtual Desk Top effort and a separate but related effort growing out of the NSF-ED working group on math education that OSTP (Daryl Chubin) and DPC (Bill Kincaid and Mike Cohen) have been involved in. I will give you a call about it this coming week. Thanks! Judy

Judy: I am forwarding this note from Henry Kelly. What is the status of the Ask Dr. Math announcement? Could you contact Henry re this matter?

Let me know the results.

Carole

Reply Separator

Subject: Re: Ask Dr. Math

Author: hkelly@ostp.eop.gov at Internet

Date: 9/25/97 9:40 PM

Henry C. Kelly

09/25/97 09:40:24 PM

Record Type: Record

To: Carole_Lacampagne @ ed.gov
cc: Jim Kohlenberger/OVP @ OVP, kalil_t @ a1.eop.gov, Linda_Roberts @ ed.gov
bcc: Records Management
Subject: Re: Ask Dr. Math

I actually don't know about any such announcement but I'd strongly urge them to wait. We could use an event to get a large number of organizations to stand up with us and announce that they'd recruited thousands of volunteers. We met with a number of professional associations and the ED people working on the virtual reference desk earlier this week and they went off all fired up and will be working with the ask-ERIC people to find out how to set up new sites. The office of public liason here (Doris Matsui) is working to set up another meeting with groups like the AARP and association of hispanic engineers etc to encourage them to set up volunteer sites which can be tied into the open system proposed by the Virtual Reference Desk concept. Try to find out what's up. The right announcement could really help!!

(Embedded
image moved Carole_Lacampagne @ ed.gov
to file: 09/25/97 06:05:47 PM
PIC29662.PCX)

Record Type: Record

To: hkelly

cc:
Subject: Ask Dr. Math

Henry: You probably knew and had something to do about it -- but apparently the President and Secretary Riley are going to highlight the Virtual Reference Desk which includes Ask Dr. Math and Ask Math Tutor. Apparently, the Virtual Reference Desk is not yet complete, but is getting there at <http://www.vrd.org>

So persistence and hard work occasionally pays off!

Carole



Christine_Chang @ ed.gov

06/27/97 09:01:00 AM

Record Type: Record

To: Daryl E. Chubin, Michael Cohen, Daniel L. Goroff, William R. Kincaid

cc:

Subject: ReDraft of Math Exercises/Partnership Document

First- I sent this from home and am not sure I have everyone's correct email. If whoever got this could forward it to everyone else, I'd appreciate it.

1. Attached is a two-pager that I hope summarizes what we agreed on today. I am working at home Friday. Please give me comments by email (I can pick up my office email from home) or you can call 202-237-7819.

2. I talked with Terry P. and Mike S. who both thought the academy would be fine (but of course, its important that Bruce want to take it on himself since we can't fund the whole thing--especially at NAS prices).

3. Terry had good ideas about organization. He suggested that we get the academy (or whomever) to coordinate a working group -- the math people and a few key folks from business, education, cbos who are leaders in our Partnership and want to get involved, and that once a product is done we can run it back through the larger ED partnership to get it out to the field. That makes the "table" we were talking about substantially smaller- a small table can coordinate and we use the department's larger table when necessary(is this too many tables to be comprehensible?)

4. Vetting:

Once you all sign off on the document, I think we need vetting by the following. I have made arbitrary assignments and suggestions that everyone should change at will.

First, Mike C (with Judy and Judy if you think useful) should talk with Bruce Alberts. Maybe this could happen as early as Friday or Monday. Once we have that we need to check with:

NCTM- JW

IEEE- JS or DG

CBMS- JS

DOT- JW

NASSMC - DC or JS

AAAS (?) - DC

NSTA (?) - DC

please add where needed

In addition, Terry P. and I are going to pull together the folks at ED (Kohlmoos, Margarita C., Wilson G., Michele Doyle etc...) who manage the components of our partnership and ask each of them to contact the 2-3 key players in their sector to get feedback and ask if they would like to be part of a working group. This will get us to most of the following:

NAESP

PTA

NMSA

NEA

AFT

BOys and Girls Clubs

4H

Girl Scouts

Urban League

NAB plus a couple of other business groups

a couple of religious organizations

Terry and I will probably also talk to Secretary Riley if this seems like it is proceeding.

I am sure that there is more, but that seems like enough to start with.

Judy

America Counts: Partnerships for High Standards in Mathematics

A. Background

The recent results of the Third International Mathematics and Science Study (TIMSS) show that U.S. fourth graders are doing better than ever in mastering the basics of arithmetic. However, U.S. eighth graders score below the international average in mathematics and many -- particularly in low-income communities -- are failing to master the mathematics necessary to pursue the higher-level mathematics and science courses that are the gateway to college and careers. TIMSS suggests that it is in the fifth, sixth, seventh and eighth grades --when our students should be moving beyond arithmetic to attempt more complex, multi-step problem solving and to learn elements of geometry, algebra, and measurement --that we need to do more to raise expectations and achievement.

Meeting this challenge will require sustained attention to strengthening mathematics teaching and learning in our nation's schools. This will mean supporting on-going professional development opportunities, improving teacher preparation, providing tools to assist schools in implementing high-quality standards-based curriculum, and encouraging research-based effective practices.

While what happens in classrooms is essential, activities outside the classroom can be an important supplement to efforts to improve student achievement. For too many students, mathematics appears to be dull and irrelevant to their daily lives or future college and career choices. And, many parents and other adults share that view -- and also lack a clear sense of what mathematics students should be expected to know and do in the middle years of school.

At the same time, there are many in the mathematics, scientific and professional communities who are proficient in mathematics and interested in helping students reach higher standards in mathematics.

America Counts would have two primary goals (1) to engage a million 4th-8th graders and their adult coaches in mathematical exercises that make mathematics engaging and relevant; and (2) through widespread dissemination of compelling examples, to create a national understanding what mathematics our 4th to 8th graders should be able to do.

B. America Counts

At the center of America Counts would be high-quality, engaging mathematical exercises for students in grades 4 to 8. Students could do these problems (either individually or in groups) with adult coaches, who could be parents, professionals such as engineers, scientists, accountants and others who use mathematics in their work, teachers, college students and others. Many problems would involve hands-on activities and real-world applications. Problems would go beyond arithmetic and story problems to involve students in probability, geometry, statistics and algebra. As such, they would serve as sound supplemental preparation for students to meet the high standards embodied in the voluntary national 8th grade mathematics

math
mentors

test.

Exercises would appear weekly, with the same recognizable format in many different places, including the Web and perhaps newspapers, cereal boxes, and other outlets. Each would be introduced by a different celebrity, CEO or important figure who would explain why they find the exercise that follow especially interesting and important and provide information on how to find hints, help and related materials. The President and Vice President could introduce the first two problems, creating a highly visible launch for a national conversation and effort.

sustainable?

work week?
solution?

Mathematics, education, professional, community and business organizations, as well as a variety of government agencies, would contribute to developing problems of the week. In addition, organizations that wished to could develop larger collections of exercises around specific themes or content areas. Businesses or other organizations might also wish to sponsor mathematical contests based on the same sorts of exercises. The exercises developed would not be random good ones, but rather would suggest, as a whole, a vision of high-quality middle school mathematics.

Once developed, the problem of the week and larger collections of exercises could be used in a variety of ways. These exercises could be used as supplementary activities in existing summer, after-school and weekend programs. Engineers, accountants, college students and others could volunteer with Girl Scout troops, Boys and Girls Clubs, 4H and others to coach students in these exercises. These exercises could also be the core of start-up activities: corporations, professional organizations and others could partner with schools or youth-serving organizations to develop weekend explorer clubs where students do hands-on mathematical exercises with adult coaches. Coaches could also work over the Internet, providing on-line assistance to students doing these exercises. And, of course, parents could use the materials with their own children.

teacher
extra cred. +

To help coaches, guidebooks on how to use these exercises effectively would be developed and hints on solving problems would be made available. Student solutions could be systematically passed around among coaches and teachers and exemplary ones publicized.



OFFICE OF SCIENCE AND TECHNOLOGY POLICY

Science Division

Executive Office of the President
436 Old Executive Office Building
Washington, DC 20502

202-456-6130

202-456-6027 (FAX)

FAX TRANSMITTAL SHEET

8/7/97

TO:

BILL KINCAID 6-7028 (please share w/ Mike)
JUDY WURTZEL 401-3095
JUDY SUNLEY 703/306-0109

PHONE NUMBER:

FAX NUMBER:

FROM:

DARYL CHUBIN

NUMBER OF PAGES (INCLUDING COVER SHEET): 7

ADDITIONAL MESSAGE:

Though dated 7/25, I received this only yesterday. It responds to a request made by Danny and me at the end of a fruitful 90 minutes with Luth Chacon. Bill + I have since talked and I am contacting Joan F-M at NRC as well.



1400 Connecticut Avenue, N.W.

Suite 800

Washington, D.C. 20004

202 667-0901

Facsimile 202 667-0902

<http://www.tbwg.com>**MEMORANDUM**

July 25, 1997

To : Daryl Chubin and Daniel Goroff
White House Office of Science and Technology Policy

From : Ruth Chacon

Re : Public Engagement Campaign on High Quality Mathematics

It's Saturday morning. Mom's fixing lunch. Dad just got back from picking up Grandma for the day. And Jordan emerges from the den with her two 14-year old friends: "Got a puzzle for you guys," she says. "It's a real brain teaser. We tried to solve it, but wanted to see what kind of answer you come up with." Over brunch, members of the family take a crack at the problem—and some come up with different approaches to get the same answer. "Let's check our answers on the Internet," Jordan says. "The TV commercial says there's a web page with solutions and other puzzles like this."

Jordan heard the puzzle during the commercial break on the Saturday morning kids line-up. The next day, Mom and Dad see the puzzle featured in the Sunday paper—in a article by the CEO of the phone company, who explains how the logic and approaches underscoring this problem are the same kind of mathematical skills the firm's employees use everyday on the job. There's an 800 number to call for more information on mathematical problem-solving, resources to support mathematics learning, additional learning tips, and employment and other opportunities that exist at the phone company.

At work the next day, the puzzle of the week pops up on Dad's computer screen when he logs onto the email system. Kids at school are talking about how they tackled the problem, and the math teacher has some extra puzzles that are as much fun to solve as this one. Grandma sees the problem on the milk carton at the grocery store. And even the ladies at the Garden Club meeting are talking about how they solved the problem this week. Mom called the 800 number for more materials and resources; and was also referred to the local branch of the phone company that, in conjunction with the teachers union and school district, have created a "math puzzlers" club that takes kids like Jordan on after-school outings and activities to reinforce mathematical learning.

This is an exciting scenario—grown from a vision launched by the creative energies of your working group. The initiative, with the working title of Math America, will help a diverse cross-section of the American public understand the relevance, fun, and necessity of high quality mathematics; overcome “learned fears,” about mathematics; and become more engaged in ongoing activities that support quantitative literacy and mathematics reform.

Record of Success. The Widmeyer Baker Group (TWBG) is proud to be considered a potential partner in this initiative. As the only strategic communications firms in the nation that specializes in media relations and public engagement on education issues, we have unparalleled experience and expertise developing, implementing and sustaining campaigns that increase knowledge, build commitment and mobilize action to realize improvements in teaching and learning. On issues of mathematics and science reform, in particular, we have a very flat learning curve. Recently, we handled release of the fourth- and eighth-grade TIMSS reports for the U.S. Department of Education, and we are creating a TIMSS resource kit for distribution to state and local leaders. TWBG provides public relations services on an ongoing basis for the NSF Systemic Initiatives, Model Institutions for Excellence, and Presidential Awards for Excellence in Mathematics and Science Teaching. Additionally, TWBG has directed media and public engagement strategies for the most every national interest group shaping mathematics, science and education reform policies in the United States. Our client base is a virtual “who’s who” of leading organizations dedicated to improvements in teaching and learning.

Goals for the Initiative. Among the goals your group has established for the initiative:

- Create public consensus about what constitutes high quality eighth-grade mathematics.
- Foster public awareness about the relevance and importance of mathematics.
- Build commitment to mathematics reform, including support for the national test.
- Engage the support of new allies and align the existing and developing mathematics and education reform initiatives of public- and private sector organizations towards shared goals—to maximize use of resources, avoid duplicative efforts, and increase the combined impact of each individual initiative.
- Create a coordinated servicing entity to support the campaign and its participating partners in the public- and private-sectors—handling public outreach, production, media relations, advertising, co-marketing and promotional arrangements, as well as data capture and lead referral systems for callers into an 800 number.

Recommended Approach and Budget. TWBG believes that these goals are quite obtainable and best achieved through a multi-media approach that would not be limited to print media advertisements. The math exercises should be featured not only in newspapers and magazines, but on TV and radio in sixty-second spots, as well as on the Internet and through other community outreach vehicles.

Based on our discussions and the goals your group has established, TWBG suggests the following approach to make best use of limited resources in launching and showcasing the initiative. Given the assembled talent in mathematics and the media relations at the White House, NSF and US Department of Education, TWBG could best serve the initiative by:

- Shaping the concept, messages, structure and initial materials for the initiative.
- Creating and maintaining the partnerships, management and service structure that will sustain the initiative.
- Managing the media launch, while focusing on sustaining post-launch publicity and ongoing placement of paid and public service advertising.
- Coordinating funding activities and leveraging the contributions of coalition partners.

From the draft materials you provided, I see that MSEB will take the lead in developing the weekly exercises and related materials. At first blush, their estimate seems rather conservative for so significant a venture, particularly if the \$500,000 - \$750,000 range covers printing or production, as well as distribution of the exercises and guidebooks.

I'd like to suggest that together, we determine a more accurate budget, based upon the concepts presented below and the role or support that will be provided by other organizations engaged in this initiative. In our meeting, you mentioned a budget of up to \$75,000. This sum could easily be exhausted through the media launch, while neglecting necessary resources that should be in place to support the fledgling coalition as it grows in the first crucial weeks and months following the kick-off event. We believe it is vital to have a central point of contact in-place immediately following the launch event with expertise in media relations, public engagement and coalition building to handle the large volume of inquiries and requests generated by publicity. Our creative services, production and media relations staff stand ready to develop cost quotations upon your review and prioritization of the campaign elements described below.

Conceptual Development, Message Design, and Production. With so many players and potential allies in mix, a centrally coordinated set of messages—and cohesive materials that embody them—are vital to preserve focus. TWBG will cull the collective wisdom and perspectives of agencies and individuals within and outside the Working Group to:

- Craft core messages that can be reflected in all campaign materials and for the media launch. This would include news releases, suggested talking points or remarks, and other materials for the kick-off news conference.
- Develop a campaign name, logo, letterhead and common vocabulary for the component parts of the initiative.
- Create campaign information kits—one for the media launch, one for educators, and one for potential partners/sponsors. Additionally, we recommend creating a general information brochure for interested individuals, which can be used as part of the fulfillment materials to those who contact the campaign's central information service (web site and 800 number).

- **Develop and produce up to three initial advertisements featuring select mathematics problems.** At least one of the problems should be conveyed in print, radio, TV and Internet formats. Additionally, TWBG suggests that the math problem be featured on a pre-recorded, outbound voice mail message that can be accessed via telephone 24-hours a day.
- **Outline criteria or standards for development of subsequent math problems.**
- **Establish the web site for the campaign.**

Partnerships: Creating and Sustaining the Coalition. There are several existing non-profit organizations that could "house" the coalition. TWBG is currently forming a 501C3 to handle projects much like this one, and with IRS approval of our non-profit status, we could become home for this enterprise. Other options include working with the Institute for Educational Leadership or the Coalition for Goals 2000—both of which are non-partisan, non-profit organizations that present a nice fit for this campaign. To support the campaign over the long haul, TWBG will work with the Working Group to:

- **Define "levels of involvement"** for potential partners/sponsors and outline criteria for participation at each level.
- **Secure initial or "founding" partners and leading spokespeople** who can participate in launch events, sponsor the first set of math problems, and work with us to identify and secure a wider community of public- and private-sectors organizations to join the coalition.
- **Develop a funding strategy and leverage initial publicity and support from founding public- and private-sector partners** to secure long-term funding and commitment from media organizations, non-profits, philanthropies, associations and corporations.
- **Create and implement a recruitment campaign** to solicit and secure additional partners and sponsors.
- **Expand existing co-marketing arrangements among corporations and media sponsors** to maximize investments and participation in the campaign.

Building Awareness: Working with Media and the Community. To raise visibility and engage the media, the public and potential partners in this initiative, TWBG will develop and execute the following three-pronged strategy.

- **Manage the media launch.** TWBG will work with the various public affairs staff at the White House, Department of Education, NSF and other partner groups to develop and disseminate the news release and media advisories; draft suggested talking points or remarks for event speakers; produce relevant fact sheets and background information of the initiatives goals, structure and key participants; brief all participants; and conduct media outreach needed to secure coverage of the launch event in September. We suggested a coordinated effort managed by TWBG and executed through the various agencies to make best use of limited

resources. At the event, we will showcase the advertisements in print, radio and TV formats—and outline the placement and dissemination strategy.

- **Create and execute a dissemination and placement plan.** TWBG will work with the founding sponsors and Working Group to finalize an advertising budget and plan that will secure high-visibility placement of the radio, TV and print advertisements at the lowest possible cost. While paid advertising in all media is the most direct route, we see a number of viable ways to leverage additional and lower cost placements. These include:
 - ⇒ **"Syndication" of the print and radio formats.** TWBG will promote the radio spots and print advertorials to stations, newspapers and magazines throughout the country—encouraging them to carry the features as a audience and public service. This approach was used successfully by AFT in "syndicating" Albert Shanker's *Where We Stand* column, which appeared as a paid advertisement in the *New York Times* and *The New Republic*, but was also carried by over 50 daily newspapers without advertising revenue, given the quality of its content.
 - ⇒ **Offering exclusivity** to a radio and broadcast or cable television network, that would agree to provide no-cost or reduced cost air time in exchange for being the premier media organization in their segment of industry engaged as a partner in the initiative.
 - ⇒ **Leveraging support from existing media advertisers.** Many of the corporations and associations that will be engaged in the coalition already purchase ad space and time in major media outlets across the country. TWBG proposes working with these groups to piggy-back on their existing media buys and reinforce "co-branding" with their messages/materials and that of the coalition. Advertisers would be asked to donate a portion of their time, space or advertising budget for placement of the weekly math puzzle. Similarly, major network advertisers can leverage their purchasing power with media organizations to request free placement of the radio or TV spots in the mix of paid placements they underwrite for specific programs—particularly those that have a tie-in to mathematics reasoning, problem solving, discovery and education.
 - ⇒ **Forging a media collaborative,** whereby the senior executives of each major media outlet would be convened by the White House to solicit and secure their ongoing public service support of the campaign. Media organizations would be asked to pledge a certain amount of public service advertising time to the campaign. Success with this approach was evidenced on a regional scale in the "Help Wanted" campaigns initiated by the Public Agenda Foundation, whereby media organizations became prime sponsors of a community dialogue on education and workforce development issues.
- **Conduct ongoing promotions through media and community outreach.** No successful public engagement campaign can survive without persistent, consistent and insistent communications through media and the community. TWBG will develop and execute a

strategy to net repeat "media hits" in communities across the country, incorporating prime news opportunities over coming months and years (including the 1998 NCTM conference or the first administration of the national test in the spring of 1999.) We will create news angles and events, feature story ideas and opinion editorials to maintain visibility, as well as seize opportunities for coverage associated with breaking news. Additionally, we would work with and through coalition partners and other business, civic, education and governance groups to increase visibility in their trade journals, at their conferences and events, and in their regular membership communiqués.

Equally important, TWBG can broker relationships with coalition partners that can offer in-kind contributions that enhance visibility. This would include concepts aimed at placing math problems and information about the initiative on cereal and milk cartons; as telephone, utility or other billing inserts; as the "message of the week" on corporate and government agency internal email and computer systems, etc.

Also, since this initiative will have a presence on the World Wide Web, TWBG suggests aggressive web-site promotions—with automatic "hot links" to related web-sites; notification on diverse listservs, newsgroups and bulletin boards; and promotional postcards to call attention to the site.

Managing and Servicing the Coalition. Our greatest concern about the viability of this campaign is the need to establish a non-federal structure to manage the coalition, handle ongoing production and promotional logistics, and develop opportunities for growth and expansion. As mentioned above, TWBG could soon host the campaign through its own 501C3. In the interim, we will:

- Establish a toll-free information telephone line for the campaign; and select and train a team to handle incoming inquiries.
- Create a "lead capture and referral" system to obtain select, appropriate information volunteered by callers—and share it with coalition partners who have additional materials and/or community based service mechanisms to follow-up with callers.
- Manage and coordinate follow-up services provided by coalition partners/sponsors so that their mathematics reform, educational improvement activities and public outreach can be aligned with the coalition's objectives.
- Suggest and support ongoing promotional activities for coalition partners/sponsors, including co-marketing arrangement, contests, media events, etc.

My colleagues and I look forward to your review and consideration of these concepts. I'll give you a call upon return from vacation to get your feedback and prepare for appropriate next steps.

PHOTOCOPY
PRESERVATION



Mike_Smith @ ed.gov
08/11/97 02:36:00 PM

Record Type: Record

To: William R. Kincaid

cc:

Subject: Re: America Counts/MathAmerica

Bill: I am with Judy W -- the points that Judy S raises are responsible issues but I think we have moved beyond them -- for you eyes see my comments belong on the poins. Thanks Mike

Message Creation Date was at 11-AUG-1997 13:02:00

Mike--

Below is an e-mail from Judy Sunley at NSF about some issues concerning the math partnership idea. Judy W. has been closer to the details of this than I have. I think her view of this was that ED, NSF and the WH should work with the Academy to launch something wherein the Academy would work with corporate and community partners (that we helped them identify) to develop the problems and supporting materials, and then ED and NSF would use the Family Involvement Partnership and similar mechanisms to help disseminate the problems and supporting materials, and that we would try to line up some PR types to help with placement of the items in newspapers, etc. Judy, I think, thought that this could eventually morph into something done by a non-profit later on, but that it would be faster to get it up and running to work closely with the academy in the early stages. Daryl Chubin and Danny Goroff with NSF seem to prefer starting off with a non-profit, and spoke with Ruth Chacon about and she has put together a proposal to that effect. My sense is that we should probably move ahead with the planning effort and work out some of these issues as we move forward, but in Wurtzel's absence (for 2 more weeks) it would be helpful to get your quick reactions on the issues Sunley raises.

Thanks.

-- Bill

----- Forwarded by William R. Kincaid/OPD/EOP on 08/11/97
12:22 PM -----

jsunley @ nsf.gov
08/09/97 05:11:00 PM
Record Type: Record

To: Daryl E. Chubin, William R. Kincaid
cc:
Subject: America Counts/MathAmerica

Colleagues --

Over the past few days, as I have read the material Daryl forwarded from Ruth Chacon and draft proposals from Joan Ferrini-Mundy at the NRC, I find that some of my nebulous feelings about what we have variously called "America Counts" and "MathAmerica" (ac/ma, for the moment) are beginning to crystallize. I feel there are some unresolved issues that must be addressed before we can move forward on this effort. I am sorry that Judy W. is on vacation right now, as I hate to raise these issues when she cannot respond, but I think it is important to raise them and attempt to resolve them -- preferably before the policy document goes forward, although it does not mention ac/ma as such, certainly before there is a rollout of the working group recommendations.

First, I think the idea of putting mathematics constantly and creatively before not just a few elite but the entire American public is very exciting. I would like to see the vision Chacon describes on her first page actually comes to pass. Making it happen is a tremendously complex undertaking in which every element must be done well. (This complexity is something the Chacon document, in particular, makes very clear.) It provides us the opportunity to do something **now** for all students while we are putting the teacher preparation and enhancement activities in place and just beginning to see implementation of new materials and technologies. I remember Shirley Malcom making the point that this was critical at the Chicago meeting I attended. (Note that this idea was nowhere to be found in either the Chacon or Ferrini-Mundy documents.) This idea has been around for months -- !!!

From my discussions with Judy W. and reading these documents, I have come to see that ED and NSF have very different conceptions of the means to make it happen. The most fundamental questions is this:

Is this a Federal (or White House) initiative or a community effort with Federal sponsorship? I think it is a federal (including WH effort -- with initially a quasi-federal agency controlled by others than the federal government and potentially lots of other organizations. But the key is that the quasi-federal agency has been used to mobilize action like this before -- through a non-competitive procurement. So it can be quickly accomplished.

From my discussions with Judy W., she and colleagues at ED and DPC see this as a Federal initiative -- one that would clearly be marked with the stamp of ED, NSF, and, perhaps, the White House and be under their control. The partnerships would actually be generated by the agencies. I, on the other hand, am steeped in NSF traditions where we implement our ideas through competitive award processes where the control is in the hands of the awardee. But keep considerable control over them often. NSF might facilitate some partnerships, but would not normally prescribe them. The

awardee usually will acknowledge that they are part of a broader NSF effort working in the same direction, but the activity becomes theirs. This activity will clearly be the NRC's. Thus, when I heard ac/ma the first time, that is the context into which I put the effort. This is, at least in part, why the rapidity with which ED moved to involve the Academy and to seek out other partners surprised me. I had a very different picture of how we would be proceeding.

There are certainly some positive aspects of making this a Federal initiative. The most significant appear to me to be the visibility we gain by having the direct involvement of the President, and the ability to retain control of how the effort moves forward.

However, I feel there are also some real negatives that need to be considered.

The first has to do with the mechanism of support. A community-based initiative that NSF and ED are supporting would be within the scope of our grants or cooperative agreements. A Federal initiative where we are asking elements of the community to do specific things for us, would likely move us into the contracting realm. These distinctions are crude -- I think we could probably still argue that it is a programmatically-based effort, allowing us to use program funds. yes indeed the NSF makes contracts with their program funds as well as grants. If not, we simply do not have the flexibility in our Salaries and Expenses account to cover something like this.

The second has to do with how the concepts of partnership and competition mesh. The fact that NSF enjoys flexibility in its distribution of funds is largely because of our competitive processes. If we call the NRC or TWBG a "partner" in a Federal effort, does that obviate the need for competition? How or why? If they are the only ones that come in with proposals for these types of efforts, how do we explain our lack of openness to others who might have developed proposals had they been aware of what we were trying to do? What control do we exert over whom we might select as partners?

(I should note here that the NRC is in a rather special situation. yes We can "sole source" things to the NRC when we can argue that they are in some way uniquely qualified. With MSEB, we also have a core umbrella agreement that would allow us to supplement for related activities. right With respect to bringing people together to assess the potential of an idea like ac/ma and to determine what the substantive issues of implementation are, I think we can argue that MSEB is uniquely qualified or that it is appropriately relevant to their core activities. right It is not so clear that we can argue the same way for the development of the framework and the problems. possibly but we might be able to justify some sole source money to the NRC and a small competition for other development of framework and problems. Other organizations have those capabilities and might want to compete. Also, the size of the effort would make it problematical as a supplement to an existing award.)

The third consideration is more philosophical or political in character.

The core idea for ac/ma is "America Reads" and "Read/Write/Now," both of which are ED initiatives with many community organizations as partners. They are creative approaches to improving reading and literacy using volunteerism. But they were initiated as free-standing ideas, something not associated to a national test. They are now associated with the test.

The situation is very different for ac/ma. This idea is coming to the fore through a working group organized to address improving mathematics achievement in the context of a national test in mathematics in 8th grade that one of the two agencies is developing. In part, the success of the effort will be judged by performance on that test. Thus, the framework on which the ac/ma problems are based will be tied to the test and the standards on which the test is based. yes -- this might raise some concerns but it would be true no matter how we tried to organize this effort -- whether grant or contract, competitive or not,... Ultimately, these things will also tie to curriculum. If this is a Federal initiative, it could well be viewed as an unwarranted intrusion on the prerogatives of states and localities. A community-based effort supported by the agencies is less likely to be perceived as threatening. Perhaps but unlikely (I also note that we are dealing with a somewhat different type of volunteerism, particularly to the extent that we are involving professional mathematicians, scientists and engineers.)

We need to do what we can now to make sure that an exciting concept does not run afoul of the many traps that could negatively affect its success. For NSF, some of the decisions we make now could affect the degree to which the agency could actually be an effective partner in the effort.

I hope the above provides some food for thought. How do we get decisions on these issues made? Who did she send this to?

Judy

The following attachments were included with this message:

TYPE : FILE
NAME : 080916A4.TXT

MIME-version: 1.0
Content-type: MESSAGE/RFC822

RFC-822-headers:

Received: from conversion.pmdf.eop.gov by PMDF.EOP.GOV (PMDF V5.0-4 #6879)
id <01IM8PQVBK40005N8M@PMDF.EOP.GOV>; Sat, 09 Aug 1997 16:09:30 -0400 (EDT)
Received: from storm.eop.gov (storm.eop.gov)
by PMDF.EOP.GOV (PMDF V5.0-4 #6879) id <01IM8PQUEC4G006416@PMDF.EOP.GOV>; Sat,

09 Aug 1997 16:09:29 -0400 (EDT)

Received: from mailman.nsf.gov ([128.150.11.2])

by STORM.EOP.GOV (PMDF V5.1-7 #6879)

with ESMTP id <01IM8PQ4LQ2S001LOK@STORM.EOP.GOV>; Sat,

09 Aug 1997 16:08:54 -0400 (EDT)

Received: from [128.150.150.105] (od0096.od.nsf.gov [128.150.150.105])

by mailman.nsf.gov (8.8.4/8.8.4) with ESMTP id QAA02514; Sat,

09 Aug 1997 16:08:50 -0400

X-Sender: jsunley@popsvr.nsf.gov

U.S. DEPARTMENT OF EDUCATION
OFFICE OF THE DEPUTY SECRETARY
600 INDEPENDENCE AVENUE, S.W.
WASHINGTON, D.C. 20202-0500

DATE: 8/11/97

TO:

Bill Kinkaid

ORGANIZATION:

Here are more names for your meeting (people doing great things at local level). I got the names from NCTM.

Joy

PHONE: _____

FAX: _____

FROM:

Joy Belin

PHONE: 401-0962

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TOTAL PAGES (including cover) 2

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(515) 292-8408

teachers

Principal

Post-it Fax Note	7871	Date	8/8/96	# of pages	1
To	Joy Bellio	From	Eileen		
Co./Dept.		Co.	NCTM		

Mike-- As we discussed before you left, I have done a write-up of two ideas for the FY99 budget focusing on professional development of mathematics teachers. I think that these would complement well the existing Eisenhower program and the proposed Title V. I am hoping that these can be squeezed into consideration in the last stages of working on this phase of our budget proposal.

I have attached the write up but also put it below in the email if you can't pick up the attachment.

Thanks. Judy

To: Mike Smith
From: Judy Wurtzel
Re: 2 Ideas for FY99 budget
Date: 8/3/97

Below are two proposals for the FY99 budget to support professional development in mathematics. The proposals could both best be supported via increases in Eisenhower National Activities. In developing these, I have consulted with NSF staff, Linda Darling-Hammond, Debbie Ball, Ed Esty, Bonnie Walker, Bob Schwartz, Mike Timpane, Mike Cohen and others, who have all been generally supportive of both ideas. In-house, I have discussed these with Terry Dozier, Tom Corwin, Pat Ross, Gerri Tirozzi and others.

As I remember it (I am writing this at home with out my notes), right now there is a slated \$25 million increase in Eisenhower National for FY99. The funding would go for the following: \$5 million to create a mathematics teachers network equivalent to the national writing project; \$10 million to the Eisenhower Consortia to increase their capacity; \$1-2 million to the Eisenhower National Clearinghouse to increase its capacity; and the remainder to be used for a variety of small scale projects that we are committing to do via the NSF-ED Action Strategy (projects to increase the number of highly trained professional developers, to develop some very high quality professional development tools, etc....).

Given the importance and visibility of our mathematics initiative, and the general agreement that the greatest challenge facing this effort is the enormous need of current teachers for high quality professional development focusing on mathematics content and content pedagogy, it would be terrific to be able to support additional efforts in this area. In addition, as we plan to release the NSF-ED Action Strategy, it would be good to be able to point to some additional investment in this area.

1. Leveraging teacher investments in their own professional development.

A very high percentage of the investment in professional development comes from individual teachers themselves: money they pay to take courses that enable them to move up the local districts salary scale.

Local districts ultimately underwrite the cost of these courses through increased teacher salaries. In most districts there appear to be very little guidance and few criteria about which courses teachers take in order to gain salary increases. Thus, for example, there is generally no requirement that to gain salary increases mathematics teachers must choose courses likely to improve their content knowledge and content pedagogy.

This initiative is intended to support efforts in 25-50 districts to create both incentives and requirements for teachers to take courses that will improve their content knowledge and teaching in mathematics.

Funding would be given to districts in which all the key players have indicated a willingness to create rigorous criteria for what on-going professional development is acceptable to count towards salary increases, a commitment to creating an adequate supply of such high-quality professional development. Key participants in each effort would include the school district, teachers unions and major supplier(s) of professional development (colleges, teacher centers, unions).

The projects would address and modify requirements for promotion and credits in the salary scale structure. Efforts would have to: (1) focus on developing mathematical content knowledge and content pedagogy; (2) be responsive to student and teaching standards (e.g. NBPTS); (3) be sustained and intensive; (4) provide modeling of good teaching, coaching and opportunities for teacher-to-teacher inquiry; and (5) promote teachers developing their own capacity to be instructional leaders.

Funding for districts would range from approximately \$50,000 for small districts to \$500,000 for our largest urban districts. The grants could be disbursed over 1 or 2 years. Funds could be used for a variety of activities including planning, underwriting the development of an adequate supply of high-quality professional development, and providing additional incentives for teachers-- particularly the many math teachers at the middle school level who are teaching out of field -- to participate in these activities.

In addition to funding projects, this initiative would support the outside documentation and evaluation of the funded projects to learn how effective redesign of salary-lane criteria and incentives takes place and its impact on practice in the classroom.

Possible funding level:

At \$10 million, this initiative could support 10-14 grants to large districts, 40 grants to small to mid-size districts, and approximately \$500,000 for long-term documentation and evaluation. (If two year grants were desired, the budget could be \$5 million in FY99 and \$5 million of continuations in FY2000).

2. Using video, CD-ROM and other high quality materials to improve professional development experiences of math teachers

Video and CD-ROM materials like the Stigler TIMSS study, Debbie Ball's classroom videos and the new Annenberg/WGBH video series have the

potential to be powerful professional development tools. The challenges to making this happen are:

1. creating a larger array of such materials;
2. placing video and other materials in the context of a professional development curriculum that helps ensure that the reaction to the materials is educative and that the focus on the experience is on content as much as pedagogy;
3. making video materials and accompanying curriculum widely available and supporting professional development using them.

In coordination with NSF, we could embark on a multi-year initiative that would do the following: in the first 1-2 years, fund a number of projects to simultaneously work on expanding the array of materials and, building curriculum around the materials that already exist, with particular attention to the middle school years; in years 2-5 provide funding to states, districts, teacher centers and other professional development providers who create strong efforts to use these or other high-quality video materials/curriculum in mid-to large- scale professional development efforts focused on K-8 teachers. These efforts would include intensive training of teacher leaders to use these materials and the creation of networks that provide on-going support in using the materials in professional development. With some effort from us, these materials could, eventually, become central to professional development efforts funded under Eisenhower and Title I. (While funding would focus on in-service, the materials could and should be used in teacher preparation programs as well).

An investment of \$5 million a year for 5 years would allow the development of a number of different resources and curriculum and, in years 2-5 fund projects that could reach up to 30% of the 350,000 middle school math teachers in the nation.

cc: Pat Ross, Sue Betka, Tom Corwin, Ed Esty, John Luczak, Mike Cohen, Bill Kincaid



jsunley @ nsf.gov
08/09/97 05:11:00 PM

Record Type: Record

To: Daryl E. Chubin, William R. Kincaid

cc:

Subject: America Counts/MathAmerica

Colleagues --

Over the past few days, as I have read the material Daryl forwarded from Ruth Chacon and draft proposals from Joan Ferrini-Mundy at the NRC, I find that some of my nebulous feelings about what we have variously called "America Counts" and "MathAmerica" (ac/ma, for the moment) are beginning to crystallize. I feel there are some unresolved issues that must be addressed before we can move forward on this effort. I am sorry that Judy W. is on vacation right now, as I hate to raise these issues when she cannot respond, but I think it is important to raise them and attempt to resolve them -- preferably before the policy document goes forward, although it does not mention ac/ma as such, certainly before there is a rollout of the working group recommendations.

First, I think the idea of putting mathematics constantly and creatively before not just a few elite but the entire American public is very exciting. I would like to see the vision Chacon describes on her first page actually comes to pass. Making it happen is a tremendously complex undertaking in which every element must be done well. (This complexity is something the Chacon document, in particular, makes very clear.) It provides us the opportunity to do something *now* for all students while we are putting the teacher preparation and enhancement activities in place and just beginning to see implementation of new materials and technologies. I remember Shirley Malcom making the point that this was critical at the Chicago meeting I attended. (Note that this idea was nowhere to be found in either the Chacon or Ferrini-Mundy documents.)

From my discussions with Judy W. and reading these documents, I have come to see that ED and NSF have very different conceptions of the means to make it happen. The most fundamental questions is this:

Is this a Federal (or White House) initiative or a community effort with Federal sponsorship?

From my discussions with Judy W., she and colleagues at ED and DPC see this as a Federal initiative -- one that would clearly be marked with the stamp of ED, NSF, and, perhaps, the White House and be under their control. The partnerships would actually be generated by the agencies. I, on the other hand, am steeped in NSF traditions where we implement our ideas through competitive award processes where the control is in the hands of the awardee. NSF might facilitate some partnerships, but would not normally

prescribe them. The awardee usually will acknowledge that they are part of a broader NSF effort working in the same direction, but the activity becomes theirs. Thus, when I heard ac/ma the first time, that is the context into which I put the effort. This is, at least in part, why the rapidity with which ED moved to involve the Academy and to seek out other partners surprised me. I had a very different picture of how we would be proceeding.

There are certainly some positive aspects of making this a Federal initiative. The most significant appear to me to be the visibility we gain by having the direct involvement of the President, and the ability to retain control of how the effort moves forward.

However, I feel there are also some real negatives that need to be considered.

The first has to do with the mechanism of support. A community-based initiative that NSF and ED are supporting would be within the scope of our grants or cooperative agreements. A Federal initiative where we are asking elements of the community to do specific things for us, would likely move us into the contracting realm. I think we could probably still argue that it is a programmatically-based effort, allowing us to use program funds. If not, we simply do not have the flexibility in our Salaries and Expenses account to cover something like this.

The second has to do with how the concepts of partnership and competition mesh. The fact that NSF enjoys flexibility in its distribution of funds is largely because of our competitive processes. If we call the NRC or TWBG a "partner" in a Federal effort, does that obviate the need for competition? How or why? If they are the only ones that come in with proposals for these types of efforts, how do we explain our lack of openness to others who might have developed proposals had they been aware of what we were trying to do? What control do we exert over whom we might select as partners?

(I should note here that the NRC is in a rather special situation. We can "sole source" things to the NRC when we can argue that they are in some way uniquely qualified. With MSEB, we also have a core umbrella agreement that would allow us to supplement for related activities. With respect to bringing people together to assess the potential of an idea like ac/ma and to determine what the substantive issues of implementation are, I think we can argue that MSEB is uniquely qualified or that it is appropriately relevant to their core activities. It is not so clear that we can argue the same way for the development of the framework and the problems. Other organizations have those capabilities and might want to compete. Also, the size of the effort would make it problematical as a supplement to an existing award.)

The third consideration is more philosophical or political in character. The core idea for ac/ma is "America Reads" and "Read/Write/Now," both of which are ED initiatives with many community organizations as partners. They are creative approaches to improving reading and literacy using

volunteerism. But they were initiated as free-standing ideas, something not associated to a national test.

The situation is very different for ac/ma. This idea is coming to the fore through a working group organized to address improving mathematics achievement in the context of a national test in mathematics in 8th grade that one of the two agencies is developing. In part, the success of the effort will be judged by performance on that test. Thus, the framework on which the ac/ma problems are based will be tied to the test and the standards on which the test is based. Ultimately, these things will also tie to curriculum. If this is a Federal initiative, it could well be viewed as an unwarranted intrusion on the prerogatives of states and localities. A community-based effort supported by the agencies is less likely to be perceived as threatening. (I also note that we are dealing with a somewhat different type of volunteerism, particularly to the extent that we are involving professional mathematicians, scientists and engineers.)

We need to do what we can now to make sure that an exciting concept does not run afoul of the many traps that could negatively affect its success. For NSF, some of the decisions we make now could affect the degree to which the agency could actually be an effective partner in the effort.

I hope the above provides some food for thought. How do we get decisions on these issues made?

Judy

APPENDIX 1

PRESIDENTIAL DIRECTIVE

March 6, 1997

MEMORANDUM FOR THE:
SECRETARY OF EDUCATION
DIRECTOR OF THE NATIONAL SCIENCE FOUNDATION

SUBJECT: Preparing Students to Meet National Standards of Excellence in Eighth Grade
Math and Improving Math and Science Education

Since the early 1980's, U.S. elementary and secondary school students have begun taking tougher courses, and we are starting to see the results. National Assessment of Educational Progress scores have improved in math and science, with gains in mathematics equal to at least one grade level. On the SAT, average math scores are at their highest in 25 years, even as the number and diversity of test-takers have increased. However, the eighth-grade results of the 41-Nation Third International Math and Science Study (TIMSS), released this fall, show that the U.S. is below average in math and just above average in science. That isn't acceptable: in this technology-rich information era, our students need to perform much better in both subjects, but especially in math, if they are to excel at higher level math and science courses that are the gateway to college and to citizenship, productive employment, and lifelong learning.

The first step in raising achievement is lifting expectations and setting high standards for what students should know and be able to do. TIMSS, our National Assessment of Educational Progress, and the standards developed by the National Council of Teachers of Mathematics give us a solid framework to build on. Last month, to help parents and teachers learn who needs help, what changes in teaching to make, and which schools need to improve, I asked the Secretary of Education to develop a voluntary national test for individual eighth-grade students based on widely-accepted, challenging national standards in mathematics. The national test will be available to states and local school districts to give to their students in the spring of 1999, and will measure whether students have reached a high level of mathematics proficiency.

The primary responsibility for achieving high standards rests with students, teachers, parents, and schools in local communities across America. However, it is imperative that we work to ensure that federal resources support student success as well. We must ensure that federal programs, research, and human resources are used as effectively as possible to help improve teaching and learning.

Therefore, I direct the Department of Education and the National Science Foundation, together with other agencies identified in cooperation with the Office of Science and Technology Policy and the Domestic Policy Council, to develop an action strategy for using key federal resources to assist states and local school systems prepare students to meet challenging math standards in eighth grade, and for involving the mathematics, scientific, and technical communities in support of these efforts.

U.S. DEPARTMENT OF EDUCATION
OFFICE OF THE DEPUTY SECRETARY
600 INDEPENDENCE AVENUE, S.W.
WASHINGTON, D.C. 20202-0500

DATE: 8/8/97

TO:

Bill Kinkaid

ORGANIZATION:

Bill: NCTM will give me
more names by COB today.
Joy

PHONE: _____

FAX: _____

FROM:

Joy Behn

PHONE:

401 0962 FAX: (202) 401-9027

TOTAL PAGES (including cover) 5

ROBERT P. MOSES

**THE ALGEBRA PROJECT, INC.
99 BISHOP ALLEN DRIVE
CAMBRIDGE, MA 02139**

(617) 491-0200**Fax (617) 491-0499****BIOGRAPHICAL SKETCH**

Robert P. Moses resides in Cambridge, MA with his wife, Dr. Janet Moses, Pediatrician; they have four children. Mr. Moses was born and raised in Harlem, and received his B.A. in 1956 from Hamilton College. In 1957, he received a M.A. in Philosophy from Harvard University and taught mathematics at the Horace Mann School in New York City from 1958-1961.

A pivotal Civil Rights Movement organizer and Field Secretary for the Student Non-Violent Coordinating Committee (SNCC), Robert directed its Mississippi project. A driving force behind the 1964 Mississippi Summer Project, he helped organize the Mississippi Freedom Democratic Party (MFDP), which challenged the Mississippi regulars at the 1964 Democratic Convention. From 1969 to 1975 he worked for the Ministry of Education in Tanzania, where he was chairperson of the Math Department at the Samé School.

In 1976, Mr. Moses returned to Harvard, pursuing Doctoral Studies in Philosophy. A MacArthur Fellow from 1982-1987, Robert used his fellowship to work full-time teaching algebra to 7th and 8th graders, volunteering at The M.L. King Elementary School in Cambridge. During that period, Mr. Moses developed the concept for The Algebra Project, which has been the main focus of his work for the last thirteen years. Author of The Algebra Project's *Transition Curriculum-Book 1*, Robert continues to develop curriculum, and is one of the Project's principal trainers.

05/09/97 13:31 FAX 617 491 0499

ALGEBRA PROJECT

02

**THE ALGEBRA PROJECT, INC.
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THE NATIONAL ALGEBRA PROJECT NETWORK

A BRIEF OVERVIEW

The Algebra Project builds local networks of students, parents, teachers, administrators, community activists and professionals into policy groups that take responsibility and ownership for implementing the project in their site. Such groups participate in the National Algebra Project Network. The goal of the Network is to have every student in the Project complete the College Preparatory Mathematics curriculum in High School. To that end all Algebra Project students are expected to complete Algebra 1 by the 8th or the 9th grade and either Pre-Calculus or Calculus by the 12th grade.

WHY MATHEMATICS?

In the Age of Computers, Algebra is a "passport for passage into virtually every avenue of the job market and every street of schooling". A central goal of the Algebra Project is to help its target population find their voices in the local, regional, and national equity struggles to gain access to this passport. Begun by the parent in 1982, The Algebra Project presently serves over 40,000 traditionally underserved middle school students at 22 urban and rural sites in 13 states across the South, the West Coast, the Midwest and the Northeast.

One of the central things we're saying is that the ongoing struggle for citizenship and equality for minority people is now linked to an issue of math and science literacy... It's important to make it clear that even the development of some sterling new curriculum—a real breakthrough—would not make us happy if it did not deeply and seriously address the issue of access to literacy for everyone.... One of the implications of this position has been that we have not spent a major portion of our time developing a full curriculum for any grade level. What we did was take what we thought was a minimum intervention and try to maximize its effects. In that process we began to define what we're calling a "floor"—an acceptable goal or standard for the mathematical component of math-science literacy at the middle school level. The "floor" is this: you have all the middle school students ready to do the college prep sequence when they get to high school. (Excerpt from *Remarks on the Struggle for Citizenship and Math/Science Literacy*, by Robert P. Moses, *Journal of Mathematical Behavior* 13, 107-111 (1994).)

TRAINING AND ONGOING SUPPORT

The Algebra Project employs innovative teaching strategies that encourage students in the middle grades to use their intuitive language to construct mathematical concepts from physical events drawn from familiar experiences. The introductory Algebra Project teacher training workshop introduces:

- Curricular materials;
- An experience-based curricular process;
- Inquiry based, cooperative learning strategies.

The National Algebra Project Network--A Brief Overview

In addition, following the introductory training, Algebra Project teachers are provided with ongoing staff development and site support. Because specific curricular needs vary in each region, local Algebra Projects are charged with forging linkages between Algebra Project curricular materials and local mathematics frameworks. Staff from the Algebra Project, Inc. and Positive Innovations, Inc./Southern Initiative (the coordinating offices for the National Algebra Project Network) provide technical assistance to local sites in this and other areas.

EVALUATION FINDINGS

In February 1994 the National Science Foundation (NSF) awarded the Algebra Project \$605,612 to partially support an implementation in 47 schools in the Mississippi Delta and Jackson, Mississippi, and to conduct a short term evaluation by a panel of seven nationally known educators with diverse expertise. The evaluation in Mississippi showed positive short term effects. In this site, NSF funding had enabled implementation specialists to give support through monthly classroom visits and one or two teacher workshops or teacher/community workshops each month. The panel concluded:

The Algebra Project is an important project with a potential to bring about systemic reform in Mississippi schools serving poor children in both rural and urban areas. Although in effect for only two years, we observed positive outcomes in teaching, in students' attitudes and engagement in and around mathematical ideas, in community involvement, and in movement toward systemic reform. The project has provided a curricular intervention and teacher development process that has influenced both teachers' and administrators' beliefs about mathematics and how it should be taught. We observed teaching that engaged students in constructing, representing, and discussing mathematical ideas. Students' discussions of mathematical ideas, and their positive engagement in the project overall, were impressive. The community development process is engaging parents and others who have not previously been involved in education issues. The project is building a strong foundation for systemic change through its unique process of bringing the key stakeholders together and facilitating their involvement in children's mathematics literacy.

Panelists/Consultants: Courtney B. Cazden (Harvard University); Shirley H. Conner (Sizemore High School, Hollandale, MS); Robert B. Davis (Rutgers University); Lisa D. Delpit (Georgia State University); Edgar L. Edwards (ret., Virginia State Dept. of Education); Jacqueline J. Irvine (Emory University); Charles M. Payne (Northwestern University); and Kenneth J. Travers (University of Illinois/Champaign.)

FOR MORE INFORMATION, PLEASE CONTACT:

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Brinkley Middle School**Type:** Curriculum Site**Program:** Robert Moses Algebra Project**Size:** District**Region:** Jackson, Mississippi**Grades:** 6-8**Funding Source:****Key Features:****Overview:**

School district which has implemented the Robert Moses Algebra Project. The goal of the Algebra Project is to address equity of opportunity by assisting students in inner city and rural areas to achieve mathematics literacy.

Program Elements:

- All students complete algebra as early as possible to ensure their access to college preparatory high school curriculum.
- Infusion of young college-age students.
- After-school activities.
- Connection to outside programs such as theater.

Background:**Cost:****Contact:**

Shey Robinson, Principal
(601) 987-3573

Source: PES

U.S. DEPARTMENT OF EDUCATION
OFFICE OF THE DEPUTY SECRETARY
600 INDEPENDENCE AVENUE, S.W.
WASHINGTON, D.C. 20202-0500

DATE: 8-8

TO:

Bill Kincaid

ORGANIZATION:

PHONE: _____

FAX: 456-7028

FROM:

Judy Wurtzel / Joy Belin

PHONE: 401-3281

FAX: **(202) 401-9027**

TOTAL PAGES (including cover) 4

THE WALL STREET JOURNAL

July 16, 1997

*Letters to the Editor:****Mandate for Sharply Focused Math***

In response to Lynne V. Cheney's June 11 editorial-page commentary "President Clinton's Mandate for Fuzzy Math," on the voluntary national mathematics test: Ms. Cheney asserts that the efforts to raise standards by the National Council of Teachers of Mathematics (NCTM) have resulted in students failing to learn the basics of math. While a colorful claim, this just isn't true. Ms. Cheney blatantly mischaracterizes NCTM's philosophy in claiming that it believes students needn't learn basic arithmetic.

Her views toward NCTM are an apparent change of heart. She was a member of the National Council on Education Standards and Testing. In its final report to Congress, which Ms. Cheney signed, the council specifically cited the work of NCTM as an example of how "standards and assessments can serve as catalysts for raising expectations." The model national mathematics standards, introduced by NCTM in 1989, are the basis of many states' own mathematics standards.

The recent results of the Third International Mathematics and Science Study (TIMSS) show that our nation's fourth graders are doing better than ever in mastering the basics of arithmetic. While we must aim even higher, TIMSS shows that our fourth graders perform above the international average in mathematics. These findings were in contrast to last November's results showing that eighth graders scored below the international average in mathematics. This suggests that it is in the fifth, sixth, seventh and eighth grades—when our students should be moving beyond arithmetic to learn elements of geometry, algebra, and measurement—that our schools need to do more to raise expectations and achievement. This is exactly what the voluntary national test in mathematics is intended to promote. The test will be demanding—far from the "fuzzy math" that Ms. Cheney asserts. The test will be based on the National Assessment of Educational Progress (NAEP), which shows how we are doing in

the core academic subjects by regularly testing a small sample of students. One good way to understand how badly Ms. Cheney has mischaracterized the situation is to look at two representative items from recent NAEPs.

The first question asks students to estimate the amount of a 15% tip on a restaurant check of \$24.99. Students could solve the problem in two basic ways, by rote calculation (multiplying 0.15×24.99) or by estimation. A common approach to estimation would be to realize that 10% of \$25 is \$2.50 and that 5% (or half of 10%) of \$2.50 is \$1.25. Thus, the total for a 15% tip of \$24.99 is approximately \$3.75. While most adults need to do this sort of calculation on a regular basis, and certainly whenever they dine out, only 38% of the nation's eighth graders could choose the correct answer.

The second question asks students to analyze data presented in a chart and text, which involves determining which data is relevant and which should be grouped together. To correctly answer the question, students must calculate the amount of population growth, must understand the differences between an absolute population growth and a population growth rate, and they must determine which type of population growth is being described in each section of the question. Finally, they are required not only to give a number answer, but to clearly communicate and defend their arguments, using both written English and mathematics. Only 35% of our eighth graders successfully answered this question. In business and civic life, being able to analyze this sort of data and make arguments based on it is critical. This problem shows, as often happens in the real world, that there can be more than one way of interpreting data. To be successful in the workplace and society, our students need to be able to understand and solve these sorts of problems.

MARSHALL S. SMITH
Acting Deputy Secretary
Department of Education

Washington

109. The Wall Street Journal

06/11/97

President Clinton's Mandate for Fuzzy Math

By Lynne V. Cheney

Marianne Jennings, an Arizona State business professor, has brought enlightenment to multitudes. With her commentaries on her daughter Sarah's eighth-grade math book ("MTV Math," she calls it, for its colorful pictures, disconnected ideas and generally casual attitude), she has helped parents across the country realize they are not the only ones dismayed by current mathematics education. Kids are writing about "What We Can Do to Save the Earth," and inventing their own strategies for multiplying. They're learning that getting the right answer to a math problem can be much less important than having a good rationale for a wrong one.

Sometimes called "whole math" or "fuzzy math," this latest project of the nation's colleges of education has some formidable opponents. In California, where the school system embraced whole math in 1992, parents and dissident teachers have set up a World Wide Web site called Mathematically Correct to point out the follies of whole-math instruction. The credentials of the organizers are impressive — a molecular biologist, a geophysicist, a statistician. And their left-of-center politics give them an advantage in battling an education establishment that typically dismisses all critics as far-right reactionaries. "Usually, the first words out of my mouth are 'I'm a liberal Democrat,'" says Mike McKeown, a faculty member at the Salk Institute and a member of Mathematically Correct. As a result of their efforts, several members have been appointed to panels that will influence future math curricula in California.

But such victories will be moot if President Clinton gets his way. The president wants a national test for eighth-grade mathematics. Judging from the committee the administration recently picked to oversee the exam, fuzzy thinkers will soon rule the land. The chairman is John A. Dossey, one of the brains behind ("conceptualizers" of) the Addison-Wesley textbook Sarah Jennings uses. Mr. Dossey and the committee's vice chairman, Gail

Burrill, are both past presidents of the National Council of Teachers of Mathematics, the group largely responsible for bringing whole math to the schools.

In 1989, Mr. Dossey served on an NCTM commission that issued standards for mathematics that denounced the schools' "longstanding preoccupation with computation and other traditional skills." It was no longer crucial, the commission suggested, for students to be able to add, subtract, multiply and divide. Giving such "computational algorithms" over to calculators, the standards declare, would free students to develop a conceptual understanding of mathematics and to become "active participants in creating knowledge."

The NCTM commission envisioned classrooms in which teachers operate on the sidelines. Instead of instructing, they encourage "cooperative learning." Such classrooms have become a reality in many U.S. schools. MathLand, a curriculum widely used in California, advises teachers not to "indicate in any way the rightness or wrongness of different answers," but to let students "convince" one another and reach a conclusion on their own.

Whole-math advocates say their methods will bring American math achievement up to world-class levels. But in fact kids in Japan, usually among the top performers on international assessments, do plenty of memorization and drill. Only after they have mastered basic skills are they allowed to use calculators. Moreover, during problem-solving discussions in Japanese classrooms, the teacher leads, making sure that students arrive at the solutions in the optimal way.

Whole-math advocates also argue their methods will eliminate the advantage that white males have in mathematics. In the NCTM's view, "the social injustices of past schooling practices" are responsible for minorities and women being underrepresented in advanced math study, and the reinvented math curriculum will help them succeed.

The NCTM claims that removing the "computational gate" to high school math

will provide "equal access and opportunity." In other words, minorities and women would benefit if no one were required to master basic skills before moving on to high school. Other whole-math proselytizers speak of minorities' and women's special need for cooperative rather than competitive learning (thus the emphasis on working in groups) and for connecting what they study to social concerns (thus the emphasis on saving the planet).

These "theories" are nothing more than stereotypes, backed — like much of whole math — by research so anecdotal it barely deserves the name. But that has not kept whole-math ideas from being influential, and they will become more powerful still if they are embedded in a national test. Odds are, this will happen. Like Mr. Dossey and Ms. Burrill, the overwhelming majority of the math committee members are whole-math advocates.

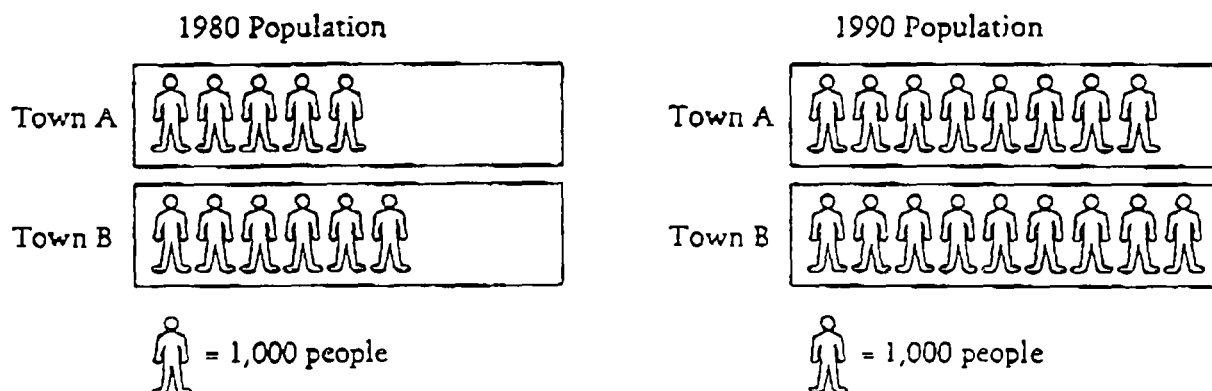
What would a national exam based on whole math look like? Here's a hint: A few years ago Mr. Dossey proposed a change to the National Assessment of Educational Progress math test, the exam the math committee is using as its starting point. He wanted a scoring system under which students would get only half credit for right answers if they didn't make clear how they arrived at them. Wrong answers would get full credit if accompanied by "appropriate strategies."

Those who are worried about a future in which everyone from doctors to actuaries to aircraft designers holds mathematical accuracy in low regard will be able to express their concerns at two public hearings the math committee is holding: one June 17 in Denver and another Aug. 5 in San Francisco. Governors are also targets for protest. They can decide whether their states will adopt the national math exam, and they should hear from citizens who do not want to participate in the further ruination of America's schools.

Mrs. Cheney is a senior fellow at the American Enterprise Institute. ■

Of the following, which is the closest approximation of a 15 percent tip on a restaurant check of \$24.99?

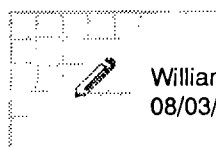
- ☐ A \$2.50
 - ☐ B \$3.00
 - ☐ C \$3.75
 - ☐ D \$4.50
 - ☐ E \$5.00
-



5. In 1980, the populations of Town A and Town B were 5,000 and 6,000, respectively. The 1990 populations of Town A and Town B were 8,000 and 9,000, respectively.

Brian claims that from 1980 to 1990 the populations of the two towns grew by the same amount. Use mathematics to explain how Brian might have justified his claim.

Darlene claims that from 1980 to 1990 the population of Town A had grown more. Use mathematics to explain how Darlene might have justified her claim.



William R. Kincaid
08/03/97 02:54:37 PM

Record Type: Record

To: Judy_Wurtzel @ ed.gov @ INET @ LNGTWY, Joy_Belin @ ed.gov
cc:
bcc: Records Management
Subject: Re: America Counts 

See my comments below. Perhaps Joy and I should talk after she has touched base Terry and Adriana.

Judy_Wurtzel @ ed.gov



Judy_Wurtzel @ ed.gov
08/02/97 11:07:00 AM

Record Type: Record

To: William R. Kincaid
cc:
Subject: America Counts

Joy/Bill--The academy is planning a small (10-12) person meeting to start the planning for America Counts. Joan Ferrini Mundy asked me for suggestions of whom to invite and I said that Joy would follow up with her. Where we are thus far:

we need

1-nctm

1-nsf

1-ed (me)

2-3- academy

1-Milwaukee Quasar project (did something similar in milwaukee)

1- really good pr person who can think about how to make this work.

Bill do you have any ideas for this? Let Joy know. Hill and Knowlton is working with NCTM-- Joy, you can suggest to Joan that she explore that with Linda Rosen. **It seems to me that Widmeyer-Baker has done**

a respectable job on the TIMSS roll-outs--certainly we have gotten the kind of coverage we wanted, more or less, and they seem to have a decent feel for the issues surrounding making math explicable to a wide audience. I believe Daryl Chubin has spoken to a woman over there preliminarily about the national partnership

concept. If you want, I can follow up with him and get the name, or you could check with Marty Orland and see who over there he would recommend based on the work they have done together. I'm not sure whether they would be better than Hill & Knowlton, but we may want to give the name to Joan and then she can decide.

1-2 corporate sponsors who are pretty close to committing. I suggested Boeing, which Joan will pursue and Ernst and Young, whom we have to close the deal with. Joy--can you talk with Terry and Bill about how to pursue this. I think if you call Jay Rosenbloom that may be enough; but the WH may want to do it since public liasion met with them as well. Terry or Bill or Margarita may also have ideas about other possible partners.

Boeing and Ernst and Young would seem like pretty good bets. I'll think about other possibilities and may discuss with Daryl, too. I continue to think that it might be nice to kick the whole thing off with a month of questions linked to the Mars mission, which would suggest that we might want to bring in NASA at an early stage as well as a "corporate partner" as much as an agency partner. If we decide to pursue Ernst and Young we might want to do a quick conference call between Joy, Terry, me and Bill White with OPL to figure out who and how we should nail down.

1-2 key community partners who would take a leadership role in conceptualizing how this would work for this whole sector (not just their organization) and would committ to being real involved. Talk with Adrianna and Terry about who would be best at this.

1 - maybe one school community representative??

Other people to put in the mix--someone from MathForum is key; someone from Mathcounts would be good (Joe Bordogna at NSF thinks highly of them as well), PTA?? **It might be good to include PTA, if possible, in part because we need to reach out to them on the tests.**

Keep in mind that the mix has to include some minority representation and real world experience.

Good luck with it. Pass on your ideas to Joan but let her make the decisions.

Thanks....!



Judy_Wurtzel @ ed.gov

07/24/97 04:39:00 PM

Record Type: Record

To: Daryl E. Chubin, Michael Cohen, William R. Kincaid

cc:

Subject: Re[2]: Possible September event on math

Judy-- I think that the ideas you have sketched out are right on target. You clearly put more thought into your reply than I put into the very quick sketch I did up for Mike Cohen on a 20 minute timeline. Clearly, if we can create an event that will effectively highlight the real possibilities for improving mathematics instruction that the NSF-ED partnership envisions, we should do so.

The folks in my Department who think a great deal about putting together events and getting press coverage were very skeptical that an event focused on this major substantive issue would get any coverage-- which is what led to focusing on Mars or NSA as a possible hook for the story.

However, if we can convince those who put together these events at the White House to focus on the substantive issue of our new strategies to increase the impact of federal education funds, that's great. I'd like to work with you to put together a proposal for such an event.

Judy

Reply Separator

Subject: Re: Possible September event on math

Author: Judy Sunley <jsunley@nsf.gov> at Internet

Date: 7/24/97 1:50 PM

Judy,

I have now given a fair amount of thought to the suggestions you sent last night about a possible September event surrounding the working group's action strategy and your explanation of the circumstances that produced it today. I have tried to provide a constructive response.

As my initial message said, I was not happy with either of the substantive aspects of the proposed events: the key items to highlight and the possible venues. My first reaction, and that of everyone at NSF with whom I have shared the message, was, "Where is the partnership between ED and NSF in addressing these important issues? Where is the substance of the working group's strategy? Where is there any substance?" I did not have good answers for these questions.

Put in very stripped-down terms, what were suggested as key aspects of the plan to highlight were release of some informational materials; creation of some additional related informational materials; a meeting; and a study. To me, this is not attention-getting; does not address the substance of the strategy; and is in no way indicative of a partnership between the two agencies that will bear the brunt of responsibility at the Federal level.

Those who remember back to the Presidential directive will want to know: What is the strategy for using Federal resources in ways that will most help the State and local school districts whose students will be taking the voluntary national test in math?

Providing information, technical assistance and visibility are elements of the strategy. The specific examples of new means of providing these elements are illustrative, but they cannot be viewed as being the strategy. In some sense, these elements are the parts of the strategy that are easy to carry out. They don't require that either agency change its programs very much, and they don't actually require the agencies to work together at anything but a surface level.

I believe the core of the action strategy is the hardest part -- raising the impact of Federal education dollars on improving math achievement in grades 5-8. As I see it, we are not talking about massive increases of Federal dollars for the priority factors of this strategy -- teacher preparation and enhancement and implementation in the classroom of new materials and technologies. Eliminating the budget deficit and the political constraints regarding Title I funds preclude that. We must make the existing dollars that are closest to the classroom work harder and more directly to the vision of the action strategy. That means, in particular, the Eisenhower (State and local) and Title I funds. We do that partly through providing information, technical assistance, and visibility that give States and districts ideas about how to proceed. But we do it most substantively by providing the wherewithal for States and districts to use those funds differently.

We have agreed that a principal component of the action strategy is that NSF will provide incentives to use funds differently in the form of planning grants or through existing systemic activities and that ED will provide encouragement for States and local districts to move toward the high standards posited in the Title I reauthorization and to participate in the NSF-funded efforts and will be supportive of States and local districts that provide innovative plans for using their funds differently (providing waivers, if needed). Our purpose is to begin to see schools, teachers, and students well-prepared to demonstrate achievement in mathematics in the first few years of the national test's administration.

I believe that this is newsworthy -- at least as newsworthy as the original announcement of the presidential directive, and more newsworthy than the items suggested for highlighting in your message. Those items could serve as illustrative points, although we may want to see if there are others we consider more appropriate.

Thus, I would suggest as key items to highlight:

1. Ultimately, it is the schools, teachers, students, and parents that have the most impact on raising levels of achievement. Our strategy is based on providing opportunities at the State and local levels that can help them make more effective, leveraged use of existing Federal resources in the classroom. We have designed a mechanism for doing that.
2. We will also enhance our efforts at providing useful information and technical assistance and at keeping this a visible effort that engages public attention.
3. Working in the classroom is not enough. We are working with national organizations that might link into local organizations to provide additional support for students, parents, and teachers.

Now let me turn to the question of venues. First, anything connected to NASA's Mars activities will be swamped by those activities. The focus of press coverage will be Mars, not math education. Granted NSA employs more mathematicians than anywhere else, we are not trying to produce more mathematicians, simply to raise the skill levels of all students. Release of the TIMSS toolkit might be more appropriate, but it is not clear to me that would get the level of attention we would like for this effort. In addition, this has been purely an ED effort. I am not sure we want an activity of one agency or the other as the focal point for the release event.

I believe we should take the opportunity to stress the State and local responsibility in this venture. The Presidential directive was released at an event outside Washington; I believe it would be appropriate to release the strategy at a similar event. It could take place in a state or urban area that has agreed to administer the test. It would be best, if we could do it in a place where we already see good examples of synergy between ED and NSF programs and where local partnerships in support of math and science education already exist. If the location has nearby NASA, DOE, DOD, DOT, or other agency laboratories or facilities, we could bring those agencies in. If we plan to write a letter from Riley and Lane to district Title I coordinators and principals of middle schools with Title I schoolwide programs, we might have that ready for release.

We lost the opportunity to do a Washington event involving the Presidential awardees in math and science. Tomorrow's event with elementary principals is focused on urban areas that will participate in the test. Perhaps one of those cities could provide the venue for the next event that announces the strategy.

Judy

> Judy and TOM- FYI, below is a plug we have put in to the WH re a
> possible september event with the President unveiling the NSF-ED
> report. It was a one-hour turn around operation which is why I didn't
> call. Let me and Bill know if you have other ideas.

>

> Also, note the bullet on the NAS activity. I just found out that we
> are planning to fund an unsolicited application from NAS on this. I
> will get the proposal around to folks. We probably should include it
> in the plan.

>

> Judy

>

>

> _____ Forward Header

>

>Subject: Possible September event on math

>Author: Judy Wurtzel at WDCT01

>Date: 7/22/97 12:23 PM

>

>

> Message: It is essential that each child master math for his or her
> chances for college and a good career. It is essential that all
> children master math for our nation's future in this technological,
> information age.

>

> We do well on teaching the kids the basics of math, but slide by 8th
> grade. We really need to focus on middle schools, raising standards
> and expectations for middle school students, helping teachers prepare
> to reach challenging math, and getting business and industry involved
> in making the importance of math clear to students and parents.

>

> Elements of event:

> Release of Interagency Action Strategy for Improving Math and Science
> Education that the President directed NSF and ED to development.

>

> Key items of plan to highlight:

>

> o Release of TIMSS Resource Kit-- takes the findings of the Third
> International Math and Science Study and makes them useful for
> educators in making decisions about curriculum and standards. The kit
> also contains a teaching module with a video study that compares
> teaching in Japan, Germany and the U.S.

>

> o Announce undertaking study of what liscencing requirements states
> have for entering middle school math teachers.

>

> o Announce a national convocation on middle school mathematics that
> will get the best experts in improving mathematics performance
> together with educators from around the nation.

>

> o Announce that the National Academy of Sciences will be creating
> professional development materials on TIMSS that will be shared in a

- > national convocation with leadership from every state.
- >
- > Possible venues for an announcement:
- > 1. Link to NASA/Mars/education activities. NASA does a great deal with
- > math education, including developing materials and teacher training.
- > They have also been creating instructional materials on the Mars
- > Mission. A possible event could involve the Mars mission, the
- > importance of math for space exploration, and how NASA is helping kids
- > get excited about math by seeing how it relates to space travel. An
- > event could take place at a NASA site.
- >
- > 2. Link to NSA activities. NSA is the largest employer of
- > mathematicians in the country; most do work developing and breaking
- > codes. NSA carries out an extensive set of education activities,
- > including presentations and tutoring in local schools. Showing the
- > relationship between math and national security could give spark to an
- > announcement (particularly for kids who love puzzles and codes). An
- > event could take place at the NSA cryptology museum.
- >
- > 3. Link to TIMSS Resource Kit announcement. On September 9–10th the
- > Department is hosting a conference to unveil and train people in using
- > the Resource Kit. The 150 participants will include representatives
- > of national education associations, leaders from the math and science
- > community around the nation and experts in helping schools meet high
- > standards in math and science.
- >
- > NOTE: We do not believe that we would be ready to announce the America
- > Counts partnership at this time. We could develop an announcement
- > event-- that would include corporate and media sponsors -- for later
- > in the fall.



Judy_Wurtzel @ ed.gov

07/22/97 12:25:00 PM

Record Type: Record

To: Michael Cohen, William R. Kincaid

cc:

Subject: Possible September event on math

Mike and Bill- here is a write up of a math event. Regan, Susan and folks here may massage it some and will include it in a larger set of events, but I got the sense from Bill that you wanted at least this piece asap.

Judy

Forward Header

Subject: Possible September event on math

Author: Judy Wurtzel at WDCT01

Date: 7/22/97 12:23 PM

Message: It is essential that each child master math for his or her chances for college and a good career. It is essential that all children master math for our nation's future in this technological, information age.

We do well on teaching the kids the basics of math, but slide by 8th grade. We really need to focus on middle schools, raising standards and expectations for middle school students, helping teachers prepare to reach challenging math, and getting business and industry involved in making the importance of math clear to students and parents.

Elements of event:

Release of Interagency Action Strategy for Improving Math and Science Education that the President directed NSF and ED to development.

Key items of plan to highlight:

- o Release of TIMSS Resource Kit-- takes the findings of the Third International Math and Science Study and makes them useful for educators in making decisions about curriculum and standards. The kit also contains a teaching module with a video study that compares teaching in Japan, Germany and the U.S.
- o Announce undertaking study of what licensing requirements states have for entering middle school math teachers.
- o Announce a national convocation on middle school mathematics that

will get the best experts in improving mathematics performance together with educators from around the nation.

o Announce that the National Academy of Sciences will be creating professional development materials on TIMSS that will be shared in a national convocation with leadership from every state.

Possible venues for an announcement:

1. Link to NASA/Mars/education activities. NASA does a great deal with math education, including developing materials and teacher training. They have also been creating instructional materials on the Mars Mission. A possible event could involve the Mars mission, the importance of math for space exploration, and how NASA is helping kids get excited about math by seeing how it relates to space travel. An event could take place at a NASA site.

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NOTE: We do not believe that we would be ready to announce the America Counts partnership at this time. We could develop an announcement event-- that would include corporate and media sponsors -- for later in the fall.



Martin_Orland @ ed.gov
07/07/97 03:30:00 PM

Record Type: Record

To: William R. Kincaid
cc:
Subject: Re: TIMSS Toolkit

Hi Bill,

We could roll out the toolkit pretty soon. Here's the latest:

A quality single copy "dummy" version of the kit could be available anytime after 7/21.

GPO tells us that will be able to fill toolkit order by the end of August.

Keep us posted on your plans.

Marty

Reply Separator _____

Subject: TIMSS Toolkit
Author: William_R_Kincaid@oa.eop.gov at Internet
Date: 7/7/97 10:42 AM

Message Creation Date was at 7-JUL-1997 10:42:00

----- Forwarded by William R. Kincaid/OPD/EOP on 07/07/97
10:42 AM -----

William R. Kincaid
07/07/97 10:29:15 AM
Record Type: Record

To: Marty_Orland @ ed.gov @ inet, Judy_Wurtzel @ ed.gov @ inet
cc:
Subject: TIMSS Toolkit

What is the latest on availability of this? Assuming we release the Action Strategy before too long, would we be in a position to roll out the toolkit at

the same time?

Thanks.

Working DRAFT; 7/31/97

AN ACTION STRATEGY FOR IMPROVING ACHIEVEMENT IN MATHEMATICS AND SCIENCE

On March 6, the President issued a memorandum (Appendix 1) directing the Secretary of Education and the Director of the National Science Foundation to form an interagency working group to develop an action strategy for using Federal resources to assist States and local school systems to meet challenging mathematics standards in the eighth grade, and for involving the mathematical, scientific, and technical communities in support of those efforts.

The Presidential directive specified that the action strategy include recommendations for the use of Federal resources to help States, local school districts, and schools improve teaching, upgrade curriculum, integrate technology and high-quality instructional materials into the classroom, and motivate students to help them understand how mathematical concepts are applied in today's global workplace. It called for the interagency group to review the current status of improvements in mathematics education and identify critical issues of need, drawing on research and input from educators and professional organizations. In addition, it called for the working group to review how Federal resources and partnerships with other organizations can help improve student achievement in science.

One of the immediate inspirations for this attention to high standards in mathematics and science education in eighth grade is the Third International Mathematics and Science Study (TIMSS), involving 500,000 students in 41 nations, including 30,000 in the United States. Results released in the Fall of 1996 show lackluster performance by U.S. 8th graders, with scores a bit above the international average in science but below the international average in mathematics. On the other hand, TIMSS 4th grade data released in the summer of 1997 show that our 4th graders are above the international average in both math and science -- and in science are outperformed only by Korea. These results clearly indicate that mathematics education in the middle school years should be an important focus for national efforts to help ensure that our students meet world class standards. (sidebar on TIMSS)

TIMSS results for the 4th grade are much more positive than the results of similar international comparisons in the past. They demonstrate that it is possible to make significant progress in international comparisons over time, and that US students can compete favorably with those of other nations in mathematics and science achievement. Our National Education Goals proclaim our intent that US students will be first in the world in mathematics and science achievement by the year 2000. In the early grades, we are making demonstrable progress toward that goal.

Beyond indicating a need to focus emphasis on grades 5 through 8, TIMSS also provides a wealth of data on how and what we teach our students -- and important clues about ways to improve both. TIMSS researchers collected not only achievement data in each participating country, but also much information about teachers and teaching, about curricula and instructional materials, about classroom lessons and interactions, and about student attitudes and habits outside the classroom. Thus, TIMSS results have become a source of constructive motivation for mounting an action strategy, taking the issue well beyond the simple comparison of scores in international test taking.

Eighth grade is a critical point in mathematics education, as achievement at that stage paves the way for students to take the advanced high school mathematics and science courses that are keys to college entrance and well-paid jobs. Today, too many students enter high school without this solid grounding in mathematics and never gain it, closing doors to opportunities for further education

and careers. Often, students (and their families) do not even know that the doors are closing, leading to a mismatch between their expectations for their futures and their actions in the present. For example, a 1995 survey conducted by the National Action Council for Minorities in Engineering found that over 70 percent of minority 9th and 11th graders viewed being a scientist or engineer as an interesting career, with 78 percent showing interest in taking college level mathematics. Yet 60 percent of the students planned to drop high school mathematics as soon as possible.

The President has proposed a voluntary national test in mathematics, to be taken near the end of eighth grade, as a very visible part of an ambitious, sustained drive for higher, more challenging standards of learning for all students. The test will be available by the spring of 1999 for those States and districts that wish to participate. Parents and teachers will receive an individual score for each student who takes the test. That score will be linked to national and international benchmarks, which will provide additional context. States, districts, and schools will be able to use data from the test in combination with other information on curriculum and teaching practice and with the results of other assessments to create a more complete picture of individual and aggregate performance.

The test is only one element of the comprehensive effort needed to accomplish the objective of having all students achieve challenging national standards for performance in eighth grade mathematics. This effort will require many individuals -- parents, students, teachers, and community leaders -- working in concert with a common understanding of what they are trying to accomplish. All parties to the effort will need a clear picture of what students should know by the end of eighth grade and what world-class performance looks like. Only then can we, as individuals and as a nation, begin to aspire to the high standards that a significant number of our students do not yet reach.

The test, in combination with a national effort to boost achievement, will provide a powerful lever to amplify the effects of existing efforts at local, State and national levels to improve K-8 mathematics and science education. This action strategy is aimed at laying the basis for such a national effort, concentrating, for the near term, on mathematics in grades 5-8, where the TIMSS results tell us we need to focus.

Response to the Presidential Directive

In response to the memorandum from the President, the Department of Education and the National Science Foundation promptly formed an interagency working group comprised of staff experienced in the areas under review. Officials of the Office of Science and Technology Policy, the Domestic Policy, and the Office of Management and Budget provided oversight. (A listing of the members of the interagency group is attached as Appendix 2).

Consistent with the directive, the interagency group immediately began a review of current Federal efforts in mathematics and science education with particular attention to mathematics education in kindergarten through eighth-grade. (See Appendix 3 for a summary of relevant programs in the two agencies.) In addition, as the memorandum instructed, the interagency group drew on research and input from educators and professional organizations, by reaching out to the broader mathematics and educational community for advice and guidance. (See Appendix 4 for a summary of these outreach efforts, including a list of organizations with which the working group consulted.) The interagency group also consulted with appropriate staff in other agencies that have, or are interested in establishing, activities in elementary and secondary-level mathematics or science education. (See Appendix 5 for a list of the agencies consulted and a summary of their input.)

Based on TIMSS results and the need to provide a strategic set of core activities, the interagency group focused on raising achievement in mathematics in grades 5-8. In support of this objective, the resulting action strategy challenges;

- The Department of Education and the National Science Foundation to mesh their disparate modes of operation and to draw in other agencies in a coordinated effort to strengthen the impact of Federal resources;
- State and local education agencies to reformulate their approaches to the use of Federal resources in order to make them more effective;
- The Nation's colleges and universities to develop new paradigms for teacher preparation, particularly for potential teachers of mathematics in grades 5-8, in conjunction with State and local education agencies and with local schools; and
- Professional organizations in mathematics, science, engineering and technology to work with community organizations and business and industry to develop a network of local partnerships to raise achievement in mathematics in grades 5-8.

Excellence in Mathematics by the End of Eighth-Grade as the Core of a National Action Strategy for Improving Achievement in Mathematics and Science

Our vision is that all American students leave eighth grade prepared to pursue the higher-level mathematics and science courses that are the gateway to college, citizenship, productive employment, and lifelong learning. Whether rich or poor, all of our students deserve an education that will help them prepare for a successful future.

Reaching this vision will require:

- High expectations, held by teachers, school administrators, parents, and students themselves, for student performance in mathematics and science;
- Challenging standards for content, materials, teaching, assessment, and achievement;
- Instructional materials and technology of high quality that incorporate these challenging standards;
- Teachers with the pedagogical skills and rigorous knowledge of mathematics and science needed to teach these subjects effectively; and
- Activities outside the classroom that reinforce the classroom experience by drawing on the support of parents, the professional community of mathematicians, scientists, and engineers, business, and the broader public.

While achievement of our vision will rely on each of these elements, progress in one area will often depend on and demand improvement in others. For instance, the introduction of high-quality

instructional materials will have little impact if teachers are not trained to use those materials effectively. Effective instruction during the school day will have limited results if parents (and, indeed, the entire community) do not support student achievement and let students know how important success in mathematics is to their future opportunities for college and careers. We must be working on all fronts -- high standards, effective curriculum, technology in the classroom, teacher training and licensure, assessments, and support from parents and the public -- to make progress towards this vision.

Achievement in mathematics by the end of the eighth grade is a critical factor in the ability of students to pursue advanced work in mathematics and science in high school and beyond. By moving to enable students to meet challenging national standards in mathematics toward the end of eighth grade, using the voluntary national test as an indicator of accomplishment, this action strategy provides both a model for and a key element in a broader, sustained effort to improve achievement in K-12 mathematics and science.

Improving Mathematics Education: Building on Strength

The action plan builds on the considerable efforts underway across the country to improve elementary and secondary mathematics and science education. Some of these activities began more than a decade ago in schools, colleges, States, and professional organizations. They were given impetus by the establishment of the National Education Goals, including the goal of being first in the world in mathematics and science educational achievement by the year 2000. Taken together, they provide a solid foundation for focused attention to mathematics in grades 5-8 that can catalyze improvements in K-12 mathematics and science education. Some of the most important current or completed activities include:

- The National Council of Teachers of Mathematics (NCTM) introduced standards for mathematics curriculum and evaluation in 1989, followed by standards for teaching and assessment in mathematics. States and communities have made these voluntary standards the basis of many of their efforts to improve mathematics education. (As is appropriate in any effort to raise standards, NCTM is now reviewing the mathematics curriculum and evaluation standards and plans to update them over the next few years.)
- A new generation of rigorous mathematics curricula aligned with the NCTM standards is beginning to appear in classrooms. By the fall of 1997, these materials will account for about 25 percent of all new textbooks purchased, and that figure should grow in succeeding years.
- TIMSS and other new assessments, coupled with in-depth research, are providing valuable information about how and what we are teaching and how students learn, and point to critical factors for improving achievement in mathematics in grades 5-8.
- Approximately 65 percent of all schools are now connected to the Internet, providing the opportunity for communication on improving mathematics education and for the use of distance learning and advanced technologies. Federal support has helped to make this possible, and the newly enacted "E-rate" will substantially reduce the cost of Internet connections for schools and allow more schools to take advantage of this learning tool.

- Many States, with support through Goals 2000, the reauthorized Elementary and Secondary Education Act, systemic initiatives, and other Federal programs, have undertaken comprehensive, system-wide education improvements geared to high standards in mathematics and science. States that were in the forefront of reforms are now beginning to enjoy the benefits in improved student performance. (Sidebar on Accountability in the States)

Critical Areas for the Strategy

Consistent with the President's directive, this action strategy identifies steps that Federal agencies, along with their partners, can take to help students reach challenging mathematics standards and to ensure that Federal resources will effectively support State and local reforms. It places special emphasis on mathematics in grades 5-8. Through consultation with outside organizations and review of Federal programs, the working group has identified three priority areas:

- Equipping teachers in grades 5-8 with the skills and knowledge to teach challenging mathematics content in effective ways, with high expectations for their students;
- Implementing high-quality, standards-based curricula and instructional materials (including effective use of educational technologies) in grade 5-8 mathematics classrooms; and
- Building public understanding of what challenging mathematics looks like in grades 5-8, and gaining public support for raising student achievement toward high standards.

The core of this action strategy is making more effective use of Federal resources in addressing these priorities in light of the Federal Government's limited role in education, which, while a national priority, is primarily a State and local responsibility. The Federal role is to provide good information, effective tools, and financial support that will assist States and local communities in ensuring that all of their students have the mathematical skills they need to succeed in the workplace as productive citizens. This includes promoting effective partnerships that mobilize support from the community -- students, parents, educators, business people, volunteers, and concerned citizens from all walks of life -- to that end.

Strengthening the Impact of Federal Resources on Mathematics Achievement in Grades 5-8

Strategies for use of Federal resources in addressing these three priority areas are interrelated and overlapping. The bulk of the Federal resources for improvement in K-12 mathematics and science education flows from the programs of the Department of Education and the National Science Foundation. (See Appendix 3 for a summary.) Developing a coherent, coordinated approach to strengthening the impact of Federal resources used to improve mathematics achievement in grades 5-8 requires taking differences among these programs into account. Drawing in other agencies in an effective manner can then follow.

In FY 1997, the National Science Foundation is investing \$377 million in K-12 science and mathematics education, including undergraduate preparation of teachers. The funds go largely to colleges and universities, State and local educational agencies, and nonprofit organizations. They are awarded through competitive review of proposals for funding of specific projects. Over the past few years, the Foundation has placed a high priority on system-wide reform of mathematics

and science education. It asks local and State educational agencies to align resources of all types, including those obtained through other Federal programs, to effect change. The Foundation highlights specific areas of emphasis within broader programming, establishes clear priorities for funding within the criteria for selection of awards, and holds grantees accountable for performance. Projects in mathematics education are grounded in the NCTM standards. Experience shows, however, that projects aimed at mathematics in grades 5-8 are scarce in comparison to those in science or to those in mathematics aimed at other grade levels.

The Department of Education will allocate approximately \$8 billion in FY 1997 through three primary formula-driven programs (Goals 2000; Eisenhower Professional Development State Grants; and Title I: Education for the Disadvantaged) that include improved achievement in mathematics and science education among their objectives. Goals 2000 aids States and school districts to develop and implement challenging academic standards and upgrade teaching and learning in order to reach the National Education Goals, including the goal of becoming first in the world in mathematics and science. The Eisenhower program places an explicit focus on science and mathematics. At least \$250 million out of the FY 1997 appropriation of \$310 million must be spent in these subject areas. The 1994 reauthorization of the program requires that States and localities use Eisenhower funds for sustained professional development that makes a difference in classroom practice. The 1994 reauthorization of Title I places new emphasis on helping disadvantaged students meet the same challenging academic standards expected of all children. States are currently developing standards and plans for moving toward them. The Department of Education works actively with States and school districts on identifying actions that can be taken to achieve significant change, provides information and examples, and makes technical assistance available as needed.

The programs of the two agencies have different approaches and strengths. The Department of Education generally provides large-scale, flexible support directly to State and/or local education agencies for improving teaching and learning to high standards, coupling this support with technical assistance. The National Science Foundation's portfolio is much smaller in scale, is targeted at improving mathematics, science, and technology education, and is established through competitive processes. This action strategy combines the agencies' strengths, permitting those involved with upgrading mathematics professional development and instruction through major Department of Education programs to draw on NSF's competitive programs to initiate change. This approach will increase the impact of Federal resources by creating synergy among these programs, realizing a significant concentration of resources for improving mathematics achievement in grades 5-8.

The work of improving achievement must be done at the State and local level, and, most fundamentally, within individual schools. State and local educational agencies can strengthen the impact of Federal resources by choosing to use them in a coordinated, concentrated way. Thus, the National Science Foundation and the Department of Education will support State and local education agencies in the coordinated use of all types of Federal, State and local funds toward improving mathematics achievement, offer examples of effective coordination in the use of such funds, and provide incentives to initiate change at the State and local levels.

- The Department of Education will actively encourage and support State and local educational agencies in the coherent use of all types of Federal funds in their efforts to meet the high content and performance standards for mathematics in grades 5-8 that they have established under Goals 2000 and Title I, providing information and technical assistance and opportunities to pool resources originating in the Department, as appropriate.

- The National Science Foundation will support development and implementation of State and local strategies for improving mathematics education in grades 5-8 and, through its competitive awards, will provide additional incentives for effective, targeted use of Title I and Eisenhower funds. In particular, the Foundation will provide competitive planning grants to jump-start intensive, coherent efforts to upgrade mathematics instruction that use Federal, State, and local funds to sustain long-term improvements.
- School and district implementation of improvement strategies are particularly important for long-term change. The principal target for the agencies' cooperative activities will be middle schools with schoolwide Title I programs and districts with many such schools. This focus permits large numbers of disadvantaged students to benefit from the enhanced impact of Federal funding. It leverages effectively the funds awarded competitively by the Foundation to schools and districts with the large resource base of the Department's Title I program. The agencies will work with principals and superintendents to address the importance of providing their students with high-quality mathematics instruction aimed at challenging national standards; to help make more concrete their understanding of what such a program of instruction means for students and teachers; and to consider mechanisms to implement such instruction in their schools.
- The two agencies will convene a national conference of State and local leaders of Eisenhower, Title I, Goals 2000, and State, urban and rural systemic initiatives, and other key actors to help participants maximize the impact of federal funding in improving mathematics education in grades 5-8.
- The two agencies will undertake a coordinated set of research and informational activities around mathematics in grades 5-8. These activities will include release of a TIMSS Toolkit that contains specific tools for professional development, curriculum analysis, and achievement benchmarking; readministering TIMSS in the spring of 1999 to get updated information on our international standing; a program of research informing evolution of the eighth grade national test over time; and a sustained agenda of basic research in teaching and learning of mathematics.
- The Department and the Foundation will work with other agencies to enhance the impact of Federal resources by upgrading their activities to reinforce a standards-based approach for mathematics in grades 5-8.

[Sidebars for this section include: Texas Statewide Systemic Initiative; Title I schoolwide; DOD activities.]

Each of the specific items above will be aimed at mathematics in grades 5-8, reflecting the urgent need to raise achievement at this stage of the educational process. However, the activities described above can also serve as models for more effective approaches to educational change in the broader arena of mathematics and science education. The working group strongly endorses the idea of future efforts that would encompass all of K-12 mathematics and science education.

Equipping teachers in grades 5-8 with the skills and knowledge to teach challenging mathematics content in effective ways, with high expectations for their students

In grades 5-8, students should begin to move from mastering arithmetic to using arithmetic in complex problems and learning the foundations of geometry, algebra, probability, and statistics. Teachers must know substantial mathematics and have strong pedagogical skills if they are to be effective in helping their students make this transition and meet high standards. Practices in teacher education, licensure and certification, and in-service teacher enhancement do not always reflect these needs.

Over the next ten years, approximately 2 million teachers will enter the workforce. It is essential that these future teachers receive adequate preparation in mathematics content and pedagogy and in the use of contemporary technological tools before they enter the classroom. And many of the approximately 320,000 teachers who are already teaching mathematics in grades 5-8 would benefit from upgrading their math content knowledge and teaching skills in order to better help the Nation's students achieve high levels of excellence in mathematics.

Because of these critical needs, this action strategy addresses both the professional development of teachers who are already in the classroom and the preparation of new teachers. In order to assist current teachers, the strategy promotes sustained and intensive professional development activities that are based on mastery of mathematical content and tied to high-quality instructional materials and technology. Teacher preparation activities will aim at preparing future teachers of grades 5-8 to teach effectively challenging mathematics content geared to national standards of excellence, such as the NCTM standards.

The coordinated efforts of the Department of Education and the National Science Foundation described above should stimulate greater use of Title I and Eisenhower resources for high-quality professional development for grade 5-8 teachers of mathematics. However, the increased demand for high-quality professional development could, without action now, exceed the capacity of those individuals and organizations currently supplying it. Thus, an essential component of fully equipping teachers will be ensuring the presence of a sufficient cadre of individuals and institutions skilled in providing professional development. The two agencies will work with the mathematics communities, institutions of higher education, and other Federal agencies to help ensure the capacity to respond effectively, particularly by supporting the development of exemplary materials and by providing training opportunities for those who will become leaders in teacher professional development and teacher preparation.

To address professional development needs of current teachers, the National Science Foundation and the Department of Education will:

- Support sustained, intensive, high-quality professional development of teachers of mathematics in grades 5-8 as the cornerstone of their cooperative efforts to enhance the impact of Federal resources. These efforts will emphasize professional development for all teachers of mathematics in grades 5-8 in schools or districts, focusing on middle schools with Title I schoolwide programs and districts with many such schools. This focus will permit professional development for a significant fraction of the approximately 320,000 teachers of mathematics in grades 5-8, with particular attention to those who teach the largest numbers of disadvantaged students.

- Initiate a short-term effort to strengthen the pool of talented, committed individuals able to provide exemplary professional development for classroom teachers. The agencies will support projects that will provide intensive training experiences for those who will lead future teacher training efforts..
- Support the creation of materials for professional development of teachers of mathematics in grades 5-8 that are grounded in the NCTM standards, tied to newly emerging educational materials and technologies, and assist teachers to link mathematics to real-world skills and applications.
- Support opportunities for teachers to help one another with content knowledge and teaching skills through activities such as dissemination of information about effective forms of professional development; encouraging the development of master teachers (including those recognized through Presidential Awards for Excellence in Mathematics and Science Teaching or National Board for Professional Teaching Standards Certification), mathematics specialists, and teacher networks.

To promote improved preparation of future mathematics teachers for grades 5-8, the Department of Education and the National Science Foundation will:

- Prepare and disseminate widely a study on State licensure requirements, focusing particularly on requirements for middle school teachers of mathematics, comparisons to other nations, and the impact of licensure requirements on the knowledge of mathematical concepts that teachers bring to their work in the classroom.
- Challenge the Nation's colleges and universities to step up to the needs for preparing a new generation of teachers for the 21st century by encouraging and supporting the development of teacher preparation approaches that:
 - more tightly link college departments of mathematics and schools of education;
 - include mathematics courses focusing on the deep concepts in mathematics related to the mathematical content that future teachers of mathematics in grades 5-8 will teach;
 - demonstrate effective classroom practices; and
 - involve local K-12 schools in the design of teacher preparation requirements.
- Support the development of materials for preparation of K-8 mathematics teachers that are grounded in the NCTM standards and tied to newly emerging instructional materials and educational technologies.

[Sidebars for this section include: PRIME in Pittsburgh; Quantitative Literacy Program for Alabama K-12 Teachers; Louisiana Teacher Prep.]

Implementing high-quality, standards-based curricula and instructional materials (including curricula that use educational technologies) in grade 5-8 mathematics classrooms

The TIMSS results showed that the content of curricula and instructional materials used in US classrooms in the middle school years in 1995 differed from those in high performing countries in significant ways. The content taught in most U.S. eighth-grade mathematics classrooms would be found in the seventh grade in high-performing nations. Our low expectations for student performance are also shown by the fact that only about 25 percent of U.S. eighth grade students are enrolled in algebra courses, while in high-performing nations virtually all students have the opportunity to master the foundations of algebra and geometry by the end of eighth grade.

In addition, TIMSS noted that middle school mathematics materials covered more topics and were less focused in the U.S. than in leading countries. For example, typical American eighth grade mathematics textbooks in 1995 covered as many as 35 major topics compared to as few as 10 such topics in Japanese textbooks, leaving little time for teaching for student mastery and depth of understanding.

In a nation as large and diverse as ours, it is not surprising that there is a very large number of different text books and other instructional materials available to schools or that textbooks tend to include a wide variety of topics in order to appeal to the greatest number of teachers and schools. However, alternatives to these widely used traditional materials are now available. New, comprehensive mathematics instructional materials, linked with high standards for mathematical content and pedagogy and aligned with the NCTM standards, are now emerging from development and reaching the market. These newer materials provide a range of different approaches to classroom instruction, generally focusing on 15 or fewer topics per year.

Many schools supplement their comprehensive instructional materials -- incorporating, for example, the use of instructional technologies -- in ways that permit teachers to tailor instruction to particular classrooms. Supplementary materials can facilitate a transition to the newly emerging comprehensive materials and help take advantage of new and emerging learning technologies. They can be particularly important in grades 5-8 where students develop the conceptual foundations for the study of more advanced mathematics.

To assist schools, districts, and States in choosing and implementing effective curricula and instructional materials for mathematics in grades 5-8, the National Science Foundation and the Department of Education will:

- Make upgrading of mathematics instruction easier, particularly for middle schools with Title I school-wide programs, through encouragement and support for coordinated planning and action aimed at
 - purchase of appropriate new instructional materials;
 - necessary professional development aimed at their implementation; and
 - employment of highly skilled mathematics specialists who are prepared to teach the new materials and guide others in their implementation .
- Develop and disseminate guides to help schools and school districts select instructional materials and software most appropriate for their local needs and undertake the necessary steps to effective implementation. This effort will include reviews of instructional materials and software designated by experts as promising or exemplary.

- Provide technical assistance for schools and school districts in putting updated mathematics instructional materials to work in the classroom. This effort will link NSF-supported implementation sites dedicated to mathematics materials for grades 5-8 with broader technical assistance providers, including the Department's Eisenhower Regional Consortia and National Clearinghouse.
- Continue to support development of supplementary materials, with new priority for efforts aimed at mathematics in grades 5-8, to assist schools and districts in making the transition to standards-based comprehensive materials.
- Seed research and development of powerful models for integrating technology into classroom practice and informal learning environments. This will include support for critical expansion and evaluation efforts preceding commercialization of these models. K-8 mathematics will be a high priority in the near term.

Few other agencies have, in the past, contributed to the development of standards-based instructional materials in mathematics and science. This is changing, and the working group feels there are significant contributions that other agencies can make in this area, consistent with their primary missions. The development of supplementary materials with mission-oriented and the delivery of such materials through technology are key potential contributions.

- Agencies will work in cooperation with NASA and NCTM to develop standards-based materials along the lines of NASA's "Mission Mathematics." These materials illustrate the use of mathematics in real world examples related to the agency mission.
- The Department of Education is chairing a Federal Government-wide working group that has already begun to promote and develop -- and make it easier for teachers and others to find -- high-quality educational materials, including instructional units and related materials, for use on the Internet. The first priority of this group will be to identify materials that support teaching of challenging mathematics.
- The Departments of Defense and Education and the National Science Foundation are leading an interagency review of Federal activities related to research in learning technologies.

Each of these efforts could make new types of materials and capabilities possible in the future. Activities that enable students to achieve to high standards play an important role in all these Federal activities.

[Sidebars for this section include: *Everyday Mathematics*; Improving Teaching through Distance Learning; Eisenhower Regional Consortia for Science and Mathematics Education; MathForum; and NASA's Mission Mathematics.]

Building public understanding of what challenging mathematics looks like in grades 5-8, and gaining public support for raising student achievement toward high standards.

Our vision is that all American students leave eighth grade prepared to pursue the higher-level mathematics and science courses that are the gateway to college, good citizenship, productive employment, and lifelong learning. In realizing this vision, it is also essential that educators,

parents, and students themselves understand what high standards in mathematics look like and why they are important. This outcome requires activities and information that reinforce the classroom experience and convey the importance of mathematics achievement. Such activities might draw on the support of parents, the professional community of mathematicians, scientists, and engineers, business, and the broader public.

This section of the action strategy includes two complementary pieces. The first consists of efforts to make standards fully and clearly understood. If you don't know where you are trying to go, it is hard to get there. This is true if you are driving a car, building a house, or running a small business. To succeed, you need a vision of what success looks like so you know how to work to achieve it. The same is true in education. If parents and students and teachers don't know where they should be headed -- what they agree students should know and be able to do -- it is hard to pull together to get there. Schools must have a clear sense of what they are doing and be able to communicate effectively with parents as well as work to invite active parental participation.

The second piece builds on the first through partnerships that bring together the many groups that can contribute to the effort of helping students achieve high standards in mathematics. The partnerships will elevate the importance of mathematics achievement and provide clear avenues for interested members of the mathematics, science, business and education communities, as well as parents and interested citizens, to contribute to efforts to raise mathematics achievement.

The Federal government will foster the partnerships by promoting a national dialogue on improving mathematics, acting as a clearinghouse for information and proven approaches to action, working with partners to develop exemplary materials that can be used in their State and local efforts, and mobilizing staff and resources to support local partnership efforts. Effective partnerships must build upon and complement what goes on in the schools, and teachers and school administrators will be vital participants, either formally or informally.

In order to support these strategies, the Department of Education and the National Science Foundation will:

- Convene a national convocation on middle school mathematics to initiate a continuing dialogue on:
 - what we should expect our students to be able to achieve in mathematics by eighth grade and beyond;
 - exemplary practices in professional development, curricula, instructional materials, and technologies; and
 - opportunities for parental involvement and community support to help students meet high expectations.
- Seed the continuing national dialogue by providing a wide variety of sample items illustrating the level of standards, examples of student work, and information on curricula, instructional methods and technologies that support high standards.
- Make widely available materials on how teachers and other educators can use assessment in planning instructional improvement strategies. These materials will include information on how best to use results from the voluntary national mathematics test in efforts to interpret them to students and parents, place them in appropriate context, and improve mathematics instruction.

- Create an easy-to-use mathematics Web site providing information on the standards; standards-based instructional units for teachers; information on the national test, including sample problems and examples of student solutions; and all the other materials developed or identified as part of this action strategy.

The planned partnerships would be focused at State and local levels, with the Federal Government fostering their development, largely by drawing on the strengths of national organizations that would then work through their State and local affiliates. The Department and the Foundation will

- Connect national organizations with interests in helping to raise levels of achievement in mathematics and science with State, local and community-based organizations having similar purposes, particularly those already linked to on-going agency activities.
- Arrange for the development and dissemination of a weekly series of high-quality, engaging mathematical exercises for students in grades 5-8 that can be used as a common core activity in State and local partnership efforts. Exercises would appear in a recognizable format in many different places. Each would be introduced by a different celebrity figure who would provide motivation for the exercise. Guides for use of the exercises within the partnership efforts and information on how to find hints, help and related materials would also be provided.

The partnership activities themselves might take many forms, with each dictated by the needs of the State or locality in which they are active. See Appendix 6 for some examples.

[Sidebars for this section include: Saturday Schools Provide Tutoring Boost; A New Federal Education Partnership Program at the Department of Transportation.]

Riley Riley
testimony—
math strategy

Testimony of Secretary Richard W. Riley
before the House Committee on Science
July 16, 1997

I am pleased to be here, along with National Science Foundation Director Neal Lane, to testify about our efforts to improve math, science and technology education.

In this internationally competitive Information Age, our Nation's economic future depends in large part on American workers' proficiency in math, science and technology. The knowledge content of work is increasing, and education -- particularly in these key areas -- is essential to maintaining a competitive edge. For example, the growth of the high-tech industry has been a powerful boost to the American economy. However, the continued growth of the industry will depend on skilled and knowledgeable workers. As you are aware, the Information Technology Association of America recently issued a report estimating that there are 190,000 high tech jobs going unfilled because companies cannot find applicants with the needed math, science and technology skills. This shortage is not just in the high tech industry. Another example of the increasing math, science and technology skills needed by today's workplace can be found in the work of the National Skills Standards Board. When it commissioned pilot projects to outline baseline skills in 12 industry sectors, 11 of the 12 recommended some form of advanced mathematics proficiency, such as trigonometry or geometry.

The recent results of the Third International Mathematics and Science Study confirm that our students are not learning the more advanced mathematics necessary for the new economy. TIMSS shows that U.S. students are generally learning the basics of mathematics, scoring above the international average at the 4th grade. However, by eighth grade U.S. students score below the international average. One reason for this is our low expectations for our students. While our students tend to study and re-study arithmetic up through 7th or 8th grade, in high-performing nations students in these grades move from mastering arithmetic to using it in complex problems and learning the foundations of algebra, geometry, measurement, probability, and statistics.

Local schools, school districts and States are working hard to strengthen math, science, and technology education, aided by the National Science Foundation and the Department of Education. For example, most States have developed mathematics standards, most of them based on the challenging voluntary standards introduced by the National Council of Teachers of Mathematics in 1989. Some States are also far along in the process of aligning their assessments, teacher preparation and professional development to those standards. The Department's Eisenhower Professional Development Program, our largest program focused primarily on math and science, provides flexible formula funding that States and school districts are using to support a wide array of professional development activities tied to State standards. In addition, states and school districts are using funds under Goals 2000 and the Title I program to help students reach high standards in mathematics. And, we are seeing some progress. Mathematics achievement on the National Assessment of Educational Progress has risen slightly for all three grades measured. Between 1990 and 1996, on

a 500 point scale scores rose 11 points for 4th graders, 9 points for 8th graders and 10 points for 12th graders.

While this success is encouraging, more is necessary if we are to meet the challenges we face. That is why the President has proposed voluntary national tests in reading at fourth grade and mathematics at eighth grade. Let me take just a minute to explain the thinking behind these two voluntary tests, particularly the mathematics test at the 8th grade. My sense is that too many people just do not have any idea of what students should know and be able to do in mathematics. That is why we -- parents, citizens, business leaders, and educators -- allow our students to be short-changed and given a much less advanced curriculum than students in other nations. And that is why so many students enter high school unprepared to take the higher-level math and science courses that are the gateway to college and good careers. The voluntary national test will supply clear and concrete understandings of what students should know and what world-class performance looks like at the 8th grade.

The strong performance of our students at 4th grade in TIMSS shows that our students can do as well as any others in the world. Up until fourth grade, our expectations and curriculum are essentially the same as those in other nations -- we, like other nations, expect our students to master arithmetic. I believe that if we raise our expectations of what students can do in 5th, 6th, 7th and 8th grade, and upgrade curriculum and improve instruction, our 8th graders will also perform near the top of the international rankings.

While the test will be important in raising the bar of expectations, it cannot stand on its own. The mathematics test must be a focal point of a national effort that engages parents, educators, State and local leaders, business, professional, mathematics and scientific organizations in an all-out effort to help ensure that, by 8th grade, all students master challenging mathematics.

In order to create a framework for this national effort, and to determine what role our agencies and other federal agencies can best play, and how we can best work with outside partners, the President asked Director Lane and me to convene an interagency working group to develop an action strategy for improving achievement in mathematics and science. We have done so, and I am pleased to say that after meeting with 11 other agencies, consulting with key organizations and reviewing current federal programs and activities, the working group will soon complete that strategy.

The strategy identifies three key areas for national as well as federal focus: (1) equipping teachers with the skills and knowledge to teach challenging mathematics content effectively; (2) aiding the implementation of high-quality curriculum based on high standards; and (3) building public understanding of what challenging mathematics

looks like and gaining public support for improving student achievement toward high standards. In each area, the strategy lays out specific steps the two agencies will take in concert to achieve these aims. A key element of the strategy is to make best use of the strengths of the two agencies' programs. As you know, the Department of Education generally provides flexible support for improving teaching and learning, coupled with technical assistance, while the National Science Foundation has a portfolio of programs targeted on math, science and technology education. The strategy combines those strengths. It will help those involved in upgrading mathematics teaching and learning through the Department of Education's programs to accelerate their efforts by drawing on NSF's more targeted programs. Let me give you just two examples.

As you know, Title I of the Elementary and Secondary Education Act, funded at over \$7 billion, is the Federal Government's largest elementary and secondary education program. It provides funds to States and school districts by formula to help educationally disadvantaged students, especially those in high-poverty schools, learn to high standards. While almost half of the 9 million students participating in Title I receive some mathematics instruction through the program, historically much of that instruction has been remedial and not linked to high standards. We began to change that with the reauthorization of Title I in 1994, which emphasized holding Title I students to the same high standards as other students. Given NSF's emphasis on high-quality standards-based education in math and science for all students, it is natural for them to work with us to help effect this change by providing incentives for States and school districts to upgrade mathematics instruction in Title I schools. This effort will also expand the reach of NSF's programs by leveraging other funds. To launch this effort, the two agencies will bring together State and local leaders of Title I, the NSF State, urban and rural systemic initiatives, and other programs to set the stage for more coordinated efforts. We are also working closely together to provide good information to Title I schools about ways to use Title I to support high-quality mathematics education.

Another example concerns curriculum. As you know, the Department is generally barred by law from developing or requiring any specific curriculum. But we can provide information that helps educators make intelligent choices among all the different instructional materials, including software, that are available. We have convened an expert panel -- including representation from NSF -- that is reviewing mathematics curriculum materials and will identify which are exemplary or promising. NSF is undertaking a complementary effort to provide guidance and assistance to schools in implementing new curriculum materials. We and NSF will then work closely together to ensure that schools have full access to this information. For example, we will ask the Eisenhower Consortia -- the Department's 10 regional math and science technical assistance providers -- to disseminate this sort of good information about quality materials and best practices from both agencies.

As you can see, putting into practice this interagency action strategy will require on-going coordination. We are already making that a reality. My staff has already been meeting with NSF staff to ensure that our 1998 and 1999 program and budget priorities are complementary.

You have also asked me to speak about the President's technology initiative. There is no question that preparing our students for the 21st century includes improved academic skills and problem-solving capabilities. Today's technologies are essential resources to carry out these tasks --- to engage students in a broader and deeper study of all subject matter areas, especially science and mathematics, and to acquire the technological skills of the Information Age.

Increasing access to appropriate technology and high-quality software and ensuring that teachers have the training to use it effectively in the classroom is a top priority. Our surveys show that schools' access to the Internet has increased by 15 percent each of the past three years, up to 65% of schools currently. However, only 14 percent of classrooms have access and only 1 out of every 5 teachers is using advanced telecommunications for teaching. In more than half the schools in the nation, teachers have to learn about technology on their own.

Nevertheless, we are making progress in these efforts through the Technology Literacy Challenge Fund, a 5-year, 2-billion-dollar effort to help States implement comprehensive strategies to address the goals of the President's Technology Challenge. I am pleased to tell you that all 50 States applied for and were approved for the first round of funding this year (\$200 million). In addition, the Technology Challenge Innovation Grants is a demonstration effort that supports consortia of schools, industry, higher education and others in creating cutting-edge and compelling applications of computer and telecommunications technology in math, science and other critical areas of the curriculum. This program has generated an unprecedented response, and we expect to award a third round of grants shortly, bringing the number up to more than 60. The President's FY1998 budget request doubles the funding for these two programs, with \$75 million for the challenge grants and \$425 million for the technology fund.

Finally, the new E-rate provisions of the Telecommunications Act should have a powerful impact on schools' access to information technology. To help ensure that it is used to its full potential, we are working with the FCC, education and library groups and The National Telecommunications and Information Administration at the Department of Commerce to develop recommendations on effective implementation. This new E-rate is so important that I have sent information about it to every school superintendent in America and we are working closely with the Departments of Commerce and Agriculture to provide additional technical assistance to rural and poor schools. The Department's six Regional Technology Education Consortia are playing an important

role in helping schools take full advantage of the E-rate. The E-rate, combined with our programs, will go a long way in bringing the powerful tools of technology to teachers and students across America.

Working with the States and local communities, engaging the private sector as partners, focusing on high standards for all students, and working with families to build stronger connections between home and school is the way we must proceed. We must expect more of our students in mathematics and science, we must give our teachers the opportunities to improve and change the way they teach, and we must use technology effectively.