

**U.S. DEPARTMENT OF EDUCATION
NATIONAL MATHEMATICS ADVISORY PANEL MEETING**

MONDAY, MAY 22, 2006
SUMMARY

The Panel met in the Lecture Room of the National Academy of Sciences, 2101 Constitution Avenue, N.W., Washington, D.C., at 9:00 a.m., Larry R. Faulkner, Chair, presiding.

PANEL AND EX OFFICIO MEMBERS PRESENT:

LARRY R. FAULKNER	Chair
CAMILLA PERSSON BENBOW	Vice Chair
DEBORAH LOEWENBERG BALL	Member
A. WADE BOYKIN	Member
FRANCIS FENNELL	Member
DAVID GEARY	Member
RUSSELL GERSTEN	Member
NANCY ICHINAGA	Member
TOM LOVELESS	Member
LIPING MA	Member
VALERIE REYNA	Member
WILFRIED SCHMID	Member
ROBERT SIEGLER	Member
SANDRA STOTSKY	Member
VERN WILLIAMS	Member
HUNG-HSI WU	Member
DANIEL BERCH	Ex Officio Member
DIANE JONES	Ex Officio Member
TOM LUCE	Ex Officio Member
KATHIE OLSEN	Ex Officio Member
RAY SIMON	Ex Officio Member
GROVER WHITEHURST	Ex Officio Member

PANEL AND EX OFFICIO MEMBERS NOT PRESENT:

JIM SIMONS	Member
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ADDITIONAL ATTENDEES:

MICHAEL FEUER
STEVE WILSON

STAFF MEMBERS PRESENT:

TYRRELL FLAWN
DIANE MCCAULEY
IDA EBLINGER KELLEY
JENNIFER GRABAN
ALYSON KNAPP

Executive Director

CALL TO ORDER

Chairman Larry R. Faulkner called the May 22, 2006 National Mathematics Advisory Panel meeting to order at 9 AM.

ETHICS BRIEFING FOR MEMBERS:

**KAREN SANTORO AND MARCIA SPRAGUE, OFFICE OF GENERAL COUNSEL,
U.S. DEPARTMENT OF EDUCATION**

Ms. Santoro gave an overview of the rules of ethics that will apply to the Math Panel. The primary rule of ethics is the prohibition of conflicts of interest, or the participation of an employee in any particular matter that can affect his or her financial interest. Ms. Sprague and Ms. Santoro then gave several examples of what does and does not classify as a financial interest in a particular matter.

The next rule of ethics is to avoid the misuse of government positions. This includes using one's title in a way that suggests that the Department of Education sanctions the activities in which one engages while not serving on the Math Panel.

With regard to lobbying, any direct communications made to Congress by the Panel members in their official capacities as Panel members must be made only through official channels. However, Panel members may choose to lobby Congress or state legislatures in their personal capacities, as long as they make it clear that they are not representing the Math Panel. Also, when lobbying as private citizens, the Panel members are not permitted to use government resources in any way.

According to the Emoluments Clause of the U.S. Constitution, it is unconstitutional for the Panel members to receive emoluments from foreign governments. These provisions are particularly relevant to positions with foreign universities that are government-operated.

Ms. Santoro concluded by saying that the Panel members should feel free to contact her if they have any questions with regard to ethics.

FEDERAL ADVISORY COMMITTEE ACT BRIEFING:

**KAREN AKINS, COMMITTEE MANAGEMENT OFFICE, OFFICE OF THE
SECRETARY, U.S. DEPARTMENT OF EDUCATION**

Ms. Akins began by saying that the Federal Advisory Committee Act was enacted and

became effective January 5, 1973. This piece of legislation established a framework to cover the creation, management, operation and termination of all federal advisory committees that report to the Executive branch.

One of the major requirements of FACA is that all federal advisory committees must be chartered in order to conduct committee business. Charters must be renewed every two years.

It is also required under FACA that each agency has a committee management officer. In Ms. Akins's case, she was appointed by the Department to work with the Math Panel's Designated Federal Official to ensure the implementation of FACA.

Under FACA, the responsibility of the DFO is to act as a liaison between the Committee and the Department and to assist the Math Panel in governing and conducting meetings. The DFO will also help the Committee Management Office to comply with FACA and GSA regulations, and ensure that each meeting is announced in the Federal Register 15 days before the date of the meeting. The DFO must be present at all meetings and can conduct meetings in the absence of the Chair or Vice Chair.

Under FACA, a quorum of nine panel members must be present in order to conduct committee business. This applies to meetings conducted by teleconference, as well.

Another requirement of FACA is that all meetings be open to the public except under rare conditions described in the law. However, this does not necessarily imply public participation. The Panel must decide for itself if and how public participation will take place at its meetings.

It is required under FACA that detailed minutes are taken for every meeting. Files and records must be kept and made available to the public upon request. The Chairperson must also certify all minutes for open meetings within 90 days of the meeting.

If the Panel decides to hold meetings outside of Washington, D.C., officials in the Department must first approve these.

Finally, because the Panel members are serving as special government employees, they are entitled to reimbursement for their travel expenses.

**TRAVEL POLICY BRIEFING:
JOANN RYAN, EXECUTIVE OFFICER, OFFICE OF THE SECRETARY, U.S.
DEPARTMENT OF EDUCATION**

Ms. Ryan advised the Panel members to make all of their travel arrangements through the Department, since the Department can get contract government airfares and government lodging rates. If the Panel members choose to make their own arrangements, they will only be reimbursed for the amount that the Department would have paid at government rates. The Panel members will also receive an allowance of \$48 per day for meals and incidental expenses for the first and last days of business and \$64 for each intervening day. The Department will also pay for taxi fares to and from the airport.

**SELF-INTRODUCTIONS BY PANEL MEMBERS, EX-OFFICIO MEMBERS, AND
STAFF**

The Panel members, Ex-officio members, and staff introduced themselves.

**REMARKS AND SWEARING-IN:
SECRETARY BODMAN, U.S. DEPARTMENT OF ENERGY**

Secretary Bodman commented on how the Augustine report, “Rising Above the Gathering Storm”, details the challenges that this country faces in the areas of science, mathematics, and engineering education. The facts laid out in this report are a matter of concern not only for professional educators, but also for anyone who cares about the future of the United States. As a result of this report, the President announced the American Competitiveness Initiative, the goal of which is to fortify America’s leadership in science through additional research funding in the physical sciences.

Secretary Bodman then administered the oath of office to the Panel members.

After being sworn-in, the Panel members went to another room to complete the process by signing an affidavit form.

**INITIAL COMMENTS ON THE PANEL’S TASK:
LARRY R. FAULKNER, CHAIR AND CAMILLA PERSSON BENBOW, VICE CHAIR**

Chair Faulkner began by reminding the Panel members of what they are expected to accomplish under the Executive Order. They are to prepare an interim report by the end of January and a final report by the end of February 2008. According to the Executive Order, these reports should, at a minimum, contain recommendations based on the best available scientific evidence on the following: a) the critical skills and skill progressions for students to acquire competence in algebra and readiness for higher levels of mathematics, b) the role and appropriate design of standards of assessment in promoting mathematical competence, c) the processes by which students of various abilities and backgrounds learn mathematics, d) institutional practices, programs, and materials that are effective for improving mathematics learning, e) the training, selection, placement and professional development of teachers of mathematics in order to enhance students learning mathematics, f) the role and appropriate design of systems for delivering instruction in mathematics that combine the different elements of learning processes, curricula, instruction, teacher training and support and standards, assessments and accountability, g) needs for research in support of mathematics education, h) ideas for strengthening capabilities to teach children and youth basic mathematics, geometry, algebra, calculus and other mathematical disciplines, i) such other matters relating to mathematics education as the panel deems appropriate, and j) such other matters relating to mathematics education as the Secretary may require.

The Panel will achieve this goal through the use of several methods. They are carrying out open meetings, and have an obligation to receive information broadly from the public. They also have the capacity to undertake or to charter research on topics that may be pursued in the time they have available. The Panel may also find it necessary to break into working groups.

Chair Faulkner said that the main focus of the Panel is to consider mathematics education in the United States up to the point of and into the beginning of instruction in algebra. Secretary Spellings also hopes that the Panel will develop guidelines that will be useful for broad coordination of federal programs. Chair Faulkner concluded by saying that the Panel’s main duty

in its first meeting is to flesh out what they see as their main domains of interest.

Vice Chair Benbow added that the Panel must address two issues: improving the scientific literacy of all children in their schools, and producing more STEM professionals. This means that they must encourage and assist both children who are struggling, as well as those who are excelling in math and science.

**DEPARTMENT OF EDUCATION OVERVIEW:
RAY SIMON, EX OFFICIO NMP, DEPUTY SECRETARY, U.S. DEPARTMENT OF
EDUCATION**

Deputy Secretary Simon used a slide rule as a prop to demonstrate the point that the teaching of math and science needs to be altered to keep up with the development of new technologies, since we cannot afford to send young people into a calculator world with slide rule skills. He also stressed the point that our culture needs to give up the notion that certain students will never be good at math, and that math is not as important as reading. Also, more students need to be given the opportunity to take higher mathematics courses.

The President's American Competitiveness Initiative makes the teaching of math and science a national priority. This Initiative begins with the National Math Panel, which has been asked to evaluate the effectiveness of math instruction and learning. In the end, this evaluation will help the Department of Education to create a research base for teachers and policy makers, and will form the basis of the President's Math Now programs. These programs will give students the skills they need to master algebra and higher level math so that they can compete in the 21st century global economy. The President's Advanced Placement and International Baccalaureate incentive program will train 70,000 teachers, and triple the number of students passing AP tests.

Deputy Secretary Simon concluded by emphasizing the importance of creating a system in which every child has access to proper instruction in math and science.

**WHITE HOUSE PERSPECTIVE:
DIANE JONES, EX OFFICIO NMP, DEPUTY TO THE ASSOCIATE DIRECTOR FOR
SCIENCE, WHITE HOUSE OFFICE OF SCIENCE AND TECHNOLOGY POLICY,
AND MARTHA J. SNYDER, ASSOCIATE DIRECTOR, WHITE HOUSE DOMESTIC
POLICY COUNCIL**

Ms. Snyder said that the process of creating the Math Panel began with No Child Left Behind, which requires that every student be made proficient in math and reading, and be given access to a high quality education. The only way to ensure that this happens is through research based instruction. However, not all research is created equal. Therefore, the task of the Panel is to find the most independent, rigorous, and high quality research available, and, if necessary, commission further research. Ms. Snyder concluded by saying that the President greatly appreciates the Panel's efforts.

Ms. Jones added that the President's Science Advisor, John Marburger, also appreciates the Panel's efforts, and understands that the scientific method must help guide the educational process into the future.

**NATIONAL SCIENCE FOUNDATION PERSPECTIVE:
KATHIE OLSEN, EX OFFICIO NMP, DEPUTY DIRECTOR NATIONAL SCIENCE
FOUNDATION**

Ms. Olsen began by saying that the National Science Foundation (NSF) is the primary agency that supports basic research across all fields of science and engineering, as well as math and science education programs at all levels. The National Science Foundation supports 1) basic scientific research and research fundamental to the engineering processes, 2) programs that strengthen scientific and engineering potential, 3) science and engineering education programs at all levels and in all fields of science and engineering, and 4) an information base on science and engineering appropriate for the development of national and international policy.

As part of the American Competitiveness Initiative, the President has reemphasized the need for NSF to improve mathematics and science education. In order to do this, it is essential that NSF partner with other agencies that also have education mandates, such as the National Math Panel.

All of the NSF's programs take the best ideas and advice from the science and education communities about their priorities and needs. Proposals to the NSF all go through a merit review process. NSF's contributions to mathematical education and research and development are focused in a number of areas. At science and learning centers, they conduct basic research on how the brain works and how learning takes place. At centers for learning and teaching, they are conducting research specific to classroom practice and to developing the next generation of researchers. The NSF also has instrumental materials development programs funds, as well as a teachers' professional continuum program, which funds research and development on critical issues, including the achievement gap. The NSF is also partnering with the Department of Education on the Math-Science Partnership.

The NSF believes that the National Math Panel is important to the nation as a way to improve understanding of what kinds of innovations are effective. The NSF also looks forward to seeing the Panel's interim and final reports, and plans to use the Panel's reports to design solicitations.

**PRESENTATION ON THE PRESIDENT'S CHARGE TO THE NATIONAL MATH
PANEL, ELEMENTS OF THE EXECUTIVE ORDER:
GROVER J. (RUSS) WHITEHURST, EX OFFICIO NMP, DIRECTOR, INSTITUTE OF
EDUCATION SCIENCES, U.S. DEPARTMENT OF EDUCATION, AND DANIEL
BERCH, EX OFFICIO NMP, ASSOCIATE CHIEF, CHILD DEVELOPMENT AND
BEHAVIOR BRANCH, AND DIRECTOR, PROGRAM IN MATHEMATICS AND
SCIENCE COGNITION AND LEARNING, NATIONAL INSTITUTE OF CHILD
HEALTH AND HUMAN DEVELOPMENT**

Mr. Whitehurst commented on the ten goals set for the National Math Panel in the Executive Order. He suggested that goal f), which asks the Panel to identify and make recommendations with respect to the role and appropriate design of systems for educating children, should be the Panel's final goal. With regard to goal a), which asks the Panel to make

recommendations with respect to the critical skills and skill progressions for students to acquire competence in algebra and readiness for higher levels of mathematics, Mr. Whitehurst suggested that making these recommendations would require information gathered from a task analysis of what it means to get to the point of being competent in algebra. It will also require empirical information gathered from longitudinal studies that look at the relationship between early skill sets and later skill sets. These two types of information will have to be fit together to generate a coherent set of recommendations.

Mr. Berch posed several questions with regard to item a) for the Panel's consideration down the line. First, he asked what evidence there is regarding the sequence in which critical, conceptual, factual, and procedural knowledge and skills should be acquired, as well as the nature and development of their interdependencies. He also asked what evidence, if any, exists to support the contention that learning to recognize patterns, represent relationships, and make generalizations in the early elementary grades will ultimately lead to greater proficiency in algebra.

Mr. Loveless asked Mr. Berch and Mr. Whitehurst how scientific standards could be applied to the task analysis. Mr. Whitehurst said that he only meant to suggest that the Panel confront claims that certain skills are prerequisite to the study of algebra, and determine what rules it will use to decide whether or not to endorse these claims. He also said that charges a) and b), which deals with the appropriate design of standards and assessments in promoting mathematical competence, are logically connected, since, if the Panel can make recommendations as to what students should be learning when, then these recommendations will influence the development of standards. With regard to assessments, he said that assessment has two meanings in this context: high stakes assessment and assessment at the classroom level.

With regard to item b), Ms. Ball asked Mr. Whitehurst to describe the evidence base for determining the role and appropriate design of standards and assessments. Mr. Whitehurst replied that the evidence base is not particularly strong. However, one could look at effects at the state level of changes in assessment and accountability systems. After a set of standards has been put in place, one has to determine whether the assessments themselves map onto these standards in a reasonable way.

Mr. Wu expressed his concern over the emphasis that high stakes assessment places on multiple choice testing, since this is not as good a reflection of mathematical capability as other kinds of testing.

Mr. Williams said that, in order to address item a), they must first define what algebra is. Mr. Siegler commented that many gaps in math achievement are caused by socioeconomic disparities, and are not the fault of the schools. He then asked if it would be appropriate for the Panel to discuss this issue. Mr. Berch replied that they would discuss this issue with respect to the instructional approaches.

Ms. Stotsky suggested that the Panel explore the relationship between items b) and e) in terms of the cut scores on assessments. Mr. Gersten recommended that they look carefully at the body of research called curriculum based measurement.

With regard to item c), Mr. Berch posed the question of how and to what extent factors such as socioeconomic status, gender, learning disabilities, and socio-culture background influence the development and learning of basic numerical and arithmetic skills.

Mr. Loveless brought up the issue of students in accelerated math classes, and the

appropriateness of teaching algebra to younger children. This led to a discussion of the different varieties of algebra that are taught, and the prerequisites that are necessary to learning real algebra. Mr. Boykin suggested that they consider not only the progression and sequence of learning skills, but also the rate of acquisition of skills, since, given the nature of the educational system, it is difficult for children who fall behind to catch up. Mr. Wu asked how much research data has been collected on how people learn more involved mathematical processes. Mr. Gersten said that they will need to address the issue of what approach to take with regard to teaching both unusually talented children and children with math difficulties and disabilities. In response to Mr. Wu's question, Mr. Geary replied that they have data on psychometric tests that look at global performance, but not the type of data that shows what individual children go through to solve algebraic problems. Ms. Reyna said that there is research out there that addresses this, such as process-oriented research on proportionality and reasoning and means-end problem solving. Some of this research is quite specific, while some is more general.

Ms. Ball said they should be sure to take race, culture, ethnicity, and socioeconomic status into account when they begin to discuss differing abilities.

Ms. Ma said that it puzzled her that they are talking about doing research to find out if seventh and eighth graders can learn real algebra when they have been learning real algebra in other countries for years. Mr. Williams said that this is why they need to examine instructional methods in this country. Mr. Siegler added that, according to the TIMSS analysis of teaching practices in eight countries, the United States is particularly bad at integrating conceptual understanding and the procedures that depend on this understanding. Achieving this integration is a challenge they must face. The TIMSS data may be helpful in determining which practices are productive and which are not. Mr. Whitehurst said that the Panel should look at the full range of practices, materials, and instructional approaches and to focus on those that are most relevant for national policy.

With regards to item e), Ms. Stotsky asked if they would be able to draw on international data for teacher training. Mr. Whitehurst replied that, if these data are available, they will be provided to the Panel.

Mr. Gersten said that there are very few studies on curricula effectiveness. However, he recommended that the Panel gather as much information as they can on this topic, and use this information to proactively give guidance for developing curricula.

Mr. Berch suggested that they focus on what kinds of instructional approaches have been shown to help young children make a successful transition from early and formal number learning to school-based arithmetic. He also recommended that they look at the evidence regarding the proper use and role of concrete as well as virtual manipulatives for the learning of basic arithmetic concepts and skills. He also cautioned the Panel against simply mapping data taken from other countries onto practices used in the United States, since certain procedures can be appropriate in one context, and inappropriate in another.

Mr. Wu began a discussion on the difficulties associated with preparing and retaining good teachers. Mr. Whitehurst said that there are two sources of evidence with respect to the effect of teachers on student outcomes. One is the body of production function studies conducted by economists. These look at characteristics of the preparation of teachers and relate these predictors to outcomes. However, these relationships are generally quite weak. The other source of information is on actual performance differences among teachers. These differences can be

huge. Thus, although teachers are very important, it is difficult to tell ahead of time which teachers are going to be most successful. It is also the case that, in general, the most advantaged students end up with the best teachers. In conclusion, he said that they know enough in this area to be able to say some things that are drawn from strong evidence and have powerful implications for public policy.

Ms. Stotsky asked if there are any studies on math education courses. Mr. Whitehurst replied that he is not aware of any such studies for mathematics. Ms. Ball said that there are some studies on content of mathematical preparation, as well as research on actual mathematical knowledge of teachers and its relationship to instruction and performance. However, this data does not show a strong correlation between teacher knowledge and student performance. Once again, it is difficult to determine beforehand how effective a teacher will be. More work should be done in this area. Mr. Schmid said that, even if the direct correlation between measurable content knowledge and teaching outcome is low, it is common sense that teachers who do not have certain skills will have a great deal of trouble teaching these skills to others.

Vice Chair Benbow summarized several points made in the discussion thus far. First, the Panel must define what they mean by algebra. Second, they must determine how algebra ought to be taught. Third, they need to take into account the importance of individual differences in developing instructional strategies. She also emphasized the need to develop more performance based instructional approaches.

After lunch, Chair Faulkner suggested that the Panel begin to think about how they should organize themselves, and suggested that they break into subgroups based on the five areas that they discussed before lunch, plus the area of research. Thus, the six areas would be 1) tasks and skills, 2) standards and assessments, 3) learning processes, 4) instructional practices, 5) teachers, and 6) research. Since they will not be able to pursue all of these areas at once, they should perhaps first focus on tasks and skills and learning processes. After this, they should focus on standards and assessments and instructional practices, and finally on teachers and research. Mr. Siegler asked Chair Faulkner if he would suggest that they work through all three tiers of this plan in time to put out the interim report. Chair Faulkner replied that getting through the first two tiers by January might be a more reasonable goal. Ms. Stotsky suggested that staff members be assigned to each area of this plan. These staff members could then do a review of the research literature that is relevant to each area.

Mr. Schmid said that the Panel ought to address what EHR and the NSF are doing in terms of supporting curricula that may be doing tremendous damage to mathematics education in the United States. Mr. Gersten recommended that they begin to think more about how they are going to structure things. He also suggested that smaller working groups might be more effective. Thus, he recommended running tiers one and two concurrently. Ms. Ball added that perhaps teachers should replace standards and assessments in the second tier. Ms. Ball also asked with whom the Panel will be consulting on these matters and to what extent they will be receiving open testimony. Mr. Berch replied that the Panel would make these decisions, as long as they stayed within the general guidelines laid out in the Executive Order.

Ms. Stotsky suggested that several policy questions be raised before looking into empirical data. Chair Faulkner said that the policy questions of the definition of algebra and of international comparisons are already on the table. He also said that, unlike the Reading Panel,

the Math Panel does not need to hold hearings to define its subgroups. Mr. Schmid added that, in terms of the tasks and skills subgroup, there will not be a great deal of disagreement over what should constitute an Algebra I course, or what prerequisites are necessary to entering an Algebra I course. Mr. Fennell commented that it is not so easy to define where arithmetic leaves off and algebra begins. Mr. Berch reminded the Panel members that they must not focus exclusively on algebra. Mr. Luce said that, although this is true, the Panel is not prohibited by the Executive Order from defining algebra. Ms. Ball objected to the idea that the Panel ought to be defining curricula. Mr. Loveless said that the Panel does not intend to define curricula, but merely to define what is meant by the phrase “competence in algebra.” Mr. Boykin said that they should not limit their scope by focusing exclusively on algebra. Mr. Schmid argued that focusing on algebra actually broadens the scope of the Panel, since algebra is the gateway to higher mathematics.

Chair Faulkner recommended that the Panel break up into four concurrent working groups dealing with conceptual knowledge and skills, learning processes, instructional practices, and teachers. These groups would work individually, then periodically report on their progress to the Panel as a whole. Later, they can address assessments and standards. Mr. Loveless said that he believed that they should begin looking at assessments and standards earlier on. Vice Chair Benbow disagreed, saying that it would be unnatural to begin discussing standards and assessments before they have results and conclusions from the first four committees. With regard to receiving evidence, Chair Faulkner suggested that evidence be received only by the individual working groups, and not by the full panel.

Ms. Stotsky argued that standards and assessments should be dealt with earlier on, since standards represent what society expects of children at certain ages. Mr. Wu disagreed, since standards can only be written after they have defined their goals.

Mr. Boykin said that, since all of the topics being covered by the working groups are interrelated, he hoped that, even if each group sets its own hearings, anyone on the panel will have the opportunity to attend these hearings if they so desire. Mr. Faulkner stressed the need for recursiveness and overlap among the groups.

Mr. Faulkner said that the next step would be to set up the groups, and that the Panel members should begin thinking about which group they would like to be in. He said that they also need to discuss subsequent meetings, and suggested that they set dates for the next three meetings, spacing them at roughly six-week intervals. The next meeting would be a meeting of the Panel as a whole, even though it would consist mostly of subcommittee activity. They would discuss at a latter point whether they would like to hold all of their meetings in Washington, or hold some of them at alternate locations. They would also discuss at a later point whether future meetings should be extended to two days. The date of the next meeting would be set through email.

Meeting Adjourned.

I certify the accuracy of these minutes.

Chair’s Signature _____ Date _____

Vice Chair’s Signature _____ Date _____

ADDENDUM: PUBLIC PARTICIPANTS

First Name	Last Name	Organization
Martha	Aliaga	American Statistical Association
Hyman	Bass	University of Michigan
Marcy	Baughman	Pearson Education
Deborah Kiger	Bliss	Virginia Department of Education, Office of Middle and High School Instruction

Travis	Bolden	Quality Education for Minorities (QEM) Network
Lu Anne	Bourland	Voyager Expanded Learning
Della	Cronia	Washington Partners, LLC
Jerome	Dancis	Math Dept, Univ of Maryland
Kelly	Denson	ETS
Gay	Dillin	National Council of Teachers of Mathematics
G. Stanley	Doore	N/A
Janice	Earle, PhD	National Science Foundation
Ed	Esly	WestEd - SRI International
Joyce	Evans	National Science Foundation
Jeanine	Ferrara	William H. Sadlier, Inc.
Michael	Feuer	National Academies, National Research Council, Division of Behavioral and Social Sciences and Education
Cos D.	Fi, Ph.D.	University of North Carolina at Greensboro
Jack	Fretwell	Starboard Training Systems
Dr. Bruce	Fuchs	Office of Science Education, NIH
Barry	Garelick	NYC HOLD
Barry	Garelick	U.S. Environmental Protection Agency
Elizabeth J.	Gentry	National Institute of Standards and Technology
Alice	Gill	Educational Issues Department, AFT
Rosemary	Haggett	National Science Foundation
Katherine	Hahn	SAS Government Affairs, Federal
James	Hamos	National Science Foundation
John	Hoody	William H. Sadlier, Inc.
John	Hoven	N/A
Gerunda	Hughes	N/A
Gail	Johnston	Iowa State University
Victor J.	Katz	University of the District of Columbia
Genevieve M.	Knight	Coppin State University
First Name	Last Name	Organization
Marcia	Knutson	NEKIA
Elon	Kohlberg	Harvard Business School
Gavi	Kohlberg	Digi-Block, Inc.
Irwin	Kra	Math for America
Ken	Krehbiel	National Council of Teachers of Mathematics
Bonnie	Lehet	Princeton Regional Schools

Elizabeth	Lehnertz	Pearson Prentice Hall
Steve	Leinwand	American Institutes for Research (AIR)
Ann E.	Lewis	K12, Inc.
Donna J.	Long	MacMillan/McGraw Hill
David R.	Mandel	Mathematical Sciences Education Board, The National Academies
Joan	Mast	Scotch Plains-Fanwood Public Schools
Norma	Mellott	N/A
Jeff	Mervis	Science Magazine - American Association for the Advancement of Science
Monica	Neagoy	QEM Network
Krisann	Pearce	Akin Gump Strauss Hauer and Feld
Janet	Pittock	Scholastic
Leah Casey	Quinn, PhD	Montgomery County Public Schools
Dr. Samuel M.	Rankin, III	American Mathematical Society
Dr. Linda	Rosen	Education and Management Innovations, Inc.
Arlene	Rosowski	Buffalo Public Schools
Patricia	Ross	U.S. Department of Education
Larry	Snowwhite	Houghton Mifflin Company
Bernice	Stafford	PLATO Learning, Inc.
Deborah	Sykes	Buffalo Public Schools
Paola	Sztajn	National Science Foundation, Directorate for Education & Human Resources, Elementary, Secondary and Informal Education
Charlie	Toulmin	National Governors Association
Patsy	Wang-Iverson	Gabriella and Paul Rosenbaum Foundation
Bill	Wilkinson	Harcourt Achieve
Lorelle	Young	U.S.Metric Association, Inc
Janie L.	Zimmer	Research-Based Education, LLC