INTRODUCTION TO THE *FRAMEWORK*

Overview

The publication of the *New Jersey Mathematics Curriculum Framework* is the culmination of the New Jersey Mathematics Curriculum Framework Project, a four-year collaborative effort of the New Jersey Mathematics Coalition and the New Jersey Department of Education, which was funded by an Eisenhower grant from the United States Department of Education. This effort is also a component of New Jersey's Statewide Systemic Initiative for Improving Mathematics, Science, and Technology Education.

The purpose of the *New Jersey Mathematics Curriculum Framework* is to provide a guide to individual New Jersey teachers, administrators, and districts that will help them translate a vision of exemplary mathematics education into reality. It is anticipated also that the *New Jersey Mathematics Curriculum Framework* will serve as a model for other states.

The *New Jersey Mathematics Curriculum Framework* intends to help educators base their district's mathematics curriculum on the recommendations of New Jersey's *Mathematics Standards*. It illustrates how each of the standards can be addressed at all grade levels, and provides information and guidance on the major issues that need to be addressed, on the process of systemic change, and on the inter-related areas of content, instruction, and assessment.

Defining *Standards* and *Framework*

We may think of *standards* as expressing our common goals — first in terms of a vision, and then in terms of clear statements (called *standards*) of what we want to accomplish. A useful metaphor is that of a road map, where the goal is simply a common destination. You *do* have to know where you're going before you can figure out how you're going to get there. Moreover, since we are all starting at different places, we will take very different routes to arrive at our common goal.

We may think of a *framework* as an instrument to help us determine which route to use, how to structure our efforts, in order to achieve our goal. A useful metaphor is that of a skeletal structure. The framework is not a completed building. It is, however, the scaffolding that provides initial support, definition, and direction to our efforts to achieve our goal.

New Jersey's *Mathematics Standards* are intended to describe our goals; the *New Jersey Mathematics Curriculum Framework* is intended to help us achieve those goals. It is intended to provide policy-makers, instructional leaders, teachers, and community members with the support, definition, and direction necessary to re-envision and reconstruct mathematics education here in New Jersey and across the United States. The *New Jersey Mathematics Curriculum Framework* is not a finished product — it is not a curriculum; it does however provide the support necessary for educators who wish to generate and implement a new vision of how mathematics can be taught and learned in their schools.

... All Students

The vision that is presented in New Jersey's *Mathematics Standards* and the *New Jersey Mathematics Curriculum Framework* is articulated in high standards which are indeed achievable by all New Jersey

students. All students *need* to achieve these standards if they are to be productive in the 21st century; all students *can* achieve these standards if we create environments in which learning is both possible and expected. There may be exceptions, but these must be exceptional.

At the same time, our attention to "all students" must not diminish our dedication to providing full encouragement and opportunity to explore mathematics in greater breadth and depth to those students who have interest or talent in pursuing careers which require additional mathematical achievement.

Standards and Frameworks in a National Context

This document builds on the *Curriculum and Evaluation Standards for School Mathematics* (1989) and the *Professional Standards for Teachers of Mathematics* (1991), published by the National Council of Teachers of Mathematics.

The 1993 report from the National Governors Association to the National Education Goals Panel entitled *Promises to Keep: Creating High Standards for American Students* recommended and announced the development of national standards documents in seven other content areas. A basic theme of both the Goals 2000 legislation (March 1994) and the Improving America's Schools Act (October 1994) is the importance of developing high standards of learning for all students. A national consensus has been building around the importance of agreed-upon standards in improving the education of our country's students.

Standards and Frameworks in a New Jersey Context

A draft version of the *New Jersey Mathematics Standards* was developed by a panel of thirty-one individuals who met extensively during the 1992-1993 school year. Crafted by a broad range of New Jersey elementary, middle school, and secondary teachers, supervisors, administrators, college mathematics educators, mathematicians, and representatives of business and industry, the draft *New Jersey Mathematics Standards* was intended to provide a clear vision of exemplary mathematics learning and to define and then articulate the standards necessary for achieving quality mathematics education.

After the completion of the draft *New Jersey Mathematics Standards*, over 7000 copies of the document were distributed for review across the state. At the same time, efforts began to extend the draft *New Jersey Mathematics Standards* into a mathematics framework. The *Preliminary Version* of the *New Jersey Mathematics Curriculum Framework*, published in January 1995, contained a revised version of the standards which addressed many of the comments of both the reviewers of the draft standards and the drafters of the framework materials. As a result of this process, the standards in the *Preliminary Version* represented a statewide consensus of what mathematics educators believe are high achievable goals for all students.

During 1995, a new working group — the Governors's Review Panel for the Mathematics Curriculum Standards — built upon these draft standards and, together with similar working groups in other content areas, engaged the public in an extensive review process that resulted in modest modifications of the draft standards in mathematics. This process culminated in the adoption on May 1, 1996 by the New Jersey State Board of Education of the *Core Curriculum Content Standards*, which includes the *Mathematics Standards*, standards in six other content areas, and cross-content workplace readiness standards.

The Organization of the *New Jersey Mathematics Curriculum Framework*

The *New Jersey Mathematics Curriculum Framework* begins with a chapter entitled *New Jersey's*

Mathematics Standards. This chapter presents the vision for mathematics education in New Jersey on which the *Mathematics Standards* are based. It presents the standards that articulate that vision, and it enumerates *cumulative progress indicators* that futher define and elaborate on those standards. It describes them in terms of student experiences, providing a number of vignettes that both illustrate the vision and clarify the recommendations of the standards. The *Mathematics Standards* include the sixteen *content standards* that were adopted by the New Jersey State Board of Education, and two *learning environment standards* that were developed and approved by the task forces that prepared the *Mathematics Standards* and appear in the New Jersey State Department of Education's *Core Curriculum Content Standards*; however, since they were not considered content standards, they were not presented to the New Jersey State Board of Education for adoption.

The next chapter *The First Four Standards* discusses the processes of problem solving, reasoning, communicating mathematics, and mathematical connections that should underlie all student learning; among the "connections" discussed are the connections between mathematics and science.

Each subsequent standard has its own chapter. Each of these chapters begins with a K-12 overview of the standard, and continues with grade-level discussions for each of the K-2, 3-4, 5-6, 7-8, and 9-12 grade levels; these grade-level discussions include grade-level overviews of the content standard followed by sample activities — about 1500 altogether — for achieving the expectations enumerated in New Jersey's *Mathematics Standards* at those grade levels.

The *New Jersey Mathematics Curriculum Framework* is designed so that a teacher can easily extract information about all content areas for a particular grade level, and so that a teacher or an administrator can easily extract information about a particular content area for all grade levels.

There are two additional "planning" chapters, *Implementing a Technology Plan*, which provides guidance on strengthening a district's technology component, and *Planning for Change*, which focuses on the process of bringing about change. All of the recommendations in the *Mathematics Standards* involve significant changes in how mathematics will be taught and learned. System-wide changes involve decisions and actions at all levels: at the district level, at the school level, at the department level, and in the classroom. This chapter discusses how change takes place, both in general and in the specific contexts of professional development for school personnel and aligning school and district policies with mathematics education reform. *Planning for Change* will help you understand the change process and function as a "change agent."

Using the *New Jersey Mathematics Curriculum Framework ...*

A long document like this is not written with the expectation that it will be read from cover to cover. However, it is expected that every reader will begin by reviewing this *Introduction* and the chapter *New Jersey's Mathematics Standards* which follows.

Each chapter of the *New Jersey Mathematics Curriculum Framework* can serve as a basis for extended discussions involving teachers and administrators, and readers are encouraged to form groups in their schools and districts for this purpose.

The *New Jersey Mathematics Curriculum Framework* addresses two audiences. First, it speaks to school and district personnel who intend to implement the standards comprehensively and systemically, by bringing about change in all of their classrooms. Second, it addresses teachers who are interested in implementing the standards in their own classrooms. How each of these groups might use this document is discussed in the

next two sections.

... for Systemic Change

For school and district leaders, the first and last chapters of this *Framework*, those dealing with the *Mathematics Standards* and *Planning for Change*, are critical. Chapter 20 provides a model for understanding systemic change, and describes specific processes to follow in order to successfully bring about change. Key to the success of efforts designed to bring about systemic change is enlisting the involvement and support of all those affected by the change.

But what changes should be made? From the outset it must be acknowledged that "implementing the standards" cannot happen overnight, that there is no "magic bullet," that there is no one action which will transform all of our classrooms, all of our teachers, all of administrators, and all of our students, so that they all manifest the vision. Bringing about change involves a long process, with many inter-related components. Each district must choose specific areas with which to begin its efforts.

We suggest that, in addition to this chapter, you also peruse the various other chapters in the *Framework*, together with your colleagues. Try to reach a tentative agreement on which specific areas in these sections should be the focus of your attention. Those chapters can then be the subject of intensive review and discussion, and subsequently the focus of efforts to improve the mathematics curriculum.

It should be noted, however, that the success of such efforts will depend on whether sufficient attention is devoted to the issues raised in Chapter 20, *Planning for Change*. Thus, for example, decisions about where to focus a school's attention should involve all those within the school who will be involved in implementing those decisions.

... for Change in the Classroom

Teachers should begin by reviewing the chapter on the *Mathematics Standards*, and should then review the grade-level sections in each of the subsequent chapters. The information in each of these chapters is organized by grade-level. Thus, for example, a 5th grade teacher can easily review the grade-level 5-6 material for all of the content standards; this will include overviews of each of the content standards for this grade level, cumulative progress indicators regarding student performance at this grade level, as well as activities intended to help achieve the expectations for each of the standards. The 5th grade teacher should, however, also review the grade-level 3-4 material — to find out what the student is expected to bring to the 5th grade — and the grade-level 7-8 material — to find out what the student will be expected to do at the next grade level.

Summary

The *New Jersey Mathematics Curriculum Framework* presents a vision and a working guide to help educators create the changes necessary to achieve world-class mathematics programs in all New Jersey classrooms. This *Framework* is intended to serve as a vehicle for change, to generate commitment, and to encourage and facilitate the leadership necessary to transform mathematics education in the state. As the authors of the report *Everybody Counts* concluded: "The challenges are clear. The choices are before us. It is time to act." So too, we must accept the challenges, recognize the choices, and take action now.

References

Mathematical Sciences Education Board. *Everybody Counts*. Washington, DC: National Academy Press, 1989.

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New Jersey State Department of Education. *New Jersey Mathematics Standards*, draft, 1993.

On-Line Resources

http://dimacs.rutgers.edu/nj_math_coalition/framework.html/

The *Framework* will be available at this site during Spring 1997. In time, we hope to post additional resources relating to this standard, such as grade-specific activities submitted by New Jersey teachers, and to provide a forum to discuss the *Mathematics Standards.*