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Mathbits

Minnesota Council of Teachers of Mathematics www.mctm.org

Principles and Standards for School Mathematics: an Overview

The National Council of Teachers of Mathematics released the *Principles and Standards for School Mathematics* last April. The Principles describe particular features of high-quality mathematics education. The Standards describe the mathematical content and processes that students should learn. Together, the Principles and Standards constitute a vision to guide educators as they strive for the continual improvement of mathematics education. This article is the first in a series that will discuss various aspects of the document for the purpose of stimulating ideas and ongoing conversations about how best to help students gain a deep understanding of important mathematics.

Principles and Standards for School Mathematics extends the vision of the previous three NCTM Standards documents (Standards for Curriculum and Evaluation, Professional Teaching Standards, and Assessment Standards) and clarifies the vision in areas where previous standards gave rise to confusion or controversy. For example, the vision in the Curriculum and Evaluation Standards of the importance of conceptual understanding in learning mathematics led some to believe that NCTM put no importance on acquiring mathematical skills. The Principles document reaffirms the essential nature of conceptual understanding. In fact, the NCTM web page introduction to the Principles and Standards states: "Indeed, `learning with understanding' may well be the clarion call of the entire document." But, the same introduction goes on to say: "However, the document also strongly supports the need for `computational fluency,' for students to have efficient, accurate, and generalized methods for computing. Without the ability to compute effectively, students' ability to solve complex and interesting problems is limited." The Principles document repeatedly argues that fluency is best developed on a strong conceptual base.

Principles and Standards for School Mathematics has four major components: principles, content and process standards, grade band overviews, and implementation issues and roles. The Principles reflect basic perspectives on which educators should base decisions that affect school mathematics. The six principles are: equity, curriculum, teaching, learning, assessment, and technology.

Mathbits begins a series on PSSM

The Standards set forth ten major goals for mathematics instruction that describe the basic skills and understandings that students will need to function effectively in the twenty-first century. The first five Standards present goals in the mathematical content areas of number and operations, algebra, geometry, measurement, and data analysis and probability. The second five describe goals for the processes of problem solving, reasoning and proof, connections, communication, and representation.

The four grade-band chapters further elucidate the ten Standards in grade-bands of pre-kindergarten through grade 2, grades 3–5, grades 6–8, and grades 9–12. Each of the grade-band chapters also includes a set of expectations specific to that grade band for each of the Content Standards. These specific expectations also are collected and listed by Standard and grade-band in a separate section that can be shared with colleagues, parents, and administrators.

The final section of the document discusses the issues related to realizing the vision of *Principles and Standards*. Each of the Principles is highlighted as a way to shape answers to important questions in mathematics education. Roles and responsibilities are listed for various stakeholders: mathematics teachers, mathematics students, mathematics teacher-leaders, administrators, higher-education faculty, families and community members, and professional organizations and policymakers.

A Tribute to Viola Halvorson from a Former Student and Daughter-in-Law

Viola Halvorson was born January 7, 1911 in Hanska, Minnesota. She graduated from Alexandria High School and St. Cloud State College. Viola was a mathematics teacher in Hoffman, MN, St. Paul, and the Alexandria Public Schools from 1945 until her retirement in 1974. After her retirement she moved to Bloomington. Viola passed away October 25, 2000 at Presbyterian Homes on Lake Minnetonka in Spring Park, MN. A graveside service was held at Kincaid Cemetery in Alexandria.

In remembering Viola, perhaps those of you who knew her or have heard of her, and think it worthwhile, might consider a donation to the newly established MCTM Foundation. The MCTM Board has established this as a vehicle for scholarships and assistance to mathematics teachers.

"Viola was an early leader in MCTM."

Viola loved mathematics and young people. She inspired, encouraged, and cajoled her students and was dedicated to helping them understand mathematics—its practical uses, its complexities and its beauty. The students she taught remembered her as being there for them—to help them understand and conquer the often times puzzling world of mathematics. Many of her former students stayed in touch with Viola throughout the years.

Viola was an early leader in MCTM, serving on the MCTM Board as District 7 Director from 1961-62 and Recording Secretary from 1962-64. In 1978 she was given the MCTM Honorary Membership Award. She chartered one of the first Mu Alpha Theta high school mathematics clubs in Alexandria in the late 1950's. In 1958-59 she was a member of the writing team, supported by School Mathematics Study Group (SMSG), which produced new mathematics curriculum materials. In the early 60's she worked with Dr. Paul Rosenbloom in the Minnemath Project. During the late 60's and early 70's, Viola pioneered the study of computers in central Minnesota. She served as Director of Computer Education for the Alexandria School -- often traveling throughout the area to smaller schools, on her own time and expense, to introduce them to the new world of computers and computer programming.

Viola was a mentor for me, both professionally and personally. As my high school mathematics teacher, she was my inspiration for choosing mathematics education as my profession. She was always there to encourage and support my efforts, in good and not-so-good times. As my mother-in-law, she had the same positive influence and was the best anyone could have. Many others and I will remember her with love and honor.

Judith Jaskowiak

(Note: The author is a former president of MCTM who was also awarded an Honorary Membership.)

MCTM Foundation Established

The MCTM Board of Directors has established a Foundation for the purpose of allowing members to contribute tax-deductible dollars for special projects of the MCTM. To date, $6,500 has been contributed. The initial goal is to reach $10,000. At that time management of the fund will be turned over to the Minnesota Foundation and assets will be placed in an investment account. The hope is to rapidly reach the $25,000 level and then begin funding projects.

Initial Goal is $10,000

The Foundation Committee solicits your input on the type of projects that you would like to see the Foundation support. Some examples presented to date are loans and/or scholarships for persons entering the math teaching profession, one time projects of MCTM, and new teacher mentoring. Contact Arnie Cutler (cutler@tc.umn.edu) with additional project ideas.

We challenge you to make the Foundation a part of your charitable giving for this year and years to come. You may also add dollars to your membership renewal to be attributed to the Foundation. Contributions can be sent to MCTM, PO Box 120418, New Brighton, MN 55112. Contributors will receive the necessary documentation for income tax purposes

Before It's Too Late

A recently released report from the National Commission on Mathematics and Science Teaching for the 21st Century (also known as the Glenn Commission) states that our nation's well being depends, in part, on how well children are educated in science and mathematics and that improvement in these content areas is necessary to help children better learn basic concepts and their applications. Specifically the report outlines the following goals:

• Establish an ongoing system to improve the quality of mathematics and science teaching in grades K-12;

• Increase significantly the number of mathematics and science teachers and improve the quality of their preparation; and

• Improve the working environment and make the teaching profession more attractive for K-12 mathematics and science teachers.

(From the Executive Summary of *Before It's Too Late*.)

For more information on the Glenn Commission report, visit http://www.ed.gov/inits/Math/glenn/.

Mark Your Calendar!

SciMathMN Assembly

March 5, 2001

The SciMathMN Assembly is scheduled for Monday, March 5, 2001, from 6 – 9 p.m. The program will be broadcast via satellite from St. Paul to selected MnSCU sites throughout the state. Invitations will be mailed in early January. Contact SciMathMN to be placed on the mailing list or visit our web site in December for registration information. *Catalyst* newsletter subscribers will automatically receive invitations.

The keynote speaker, Maria Lopez Freeman, was a member of the Department of Education's Glenn Commission. She will discuss "Before It's Too Late: A Report to the Nation from the National Commission on Mathematics and Science Teaching for the 21st Century." Ms. Freeman is passionate about science and math for ALL students and is a proponent of the vision of math and science teaching embodied in the national standards.

For more information phone 651-582-8852, (toll-free) 1-877-766-5480, or visit the web site: www.scimathmn.org.

What's Happening? Middle School

In October the National Education Goals Panel (NAEP) released a report analyzing the reasons why Minnesota 8th graders scored much higher in science than in mathematics on the Third International Mathematics and Science Study (TIMMS). Minnesota 8th grade science students performed better than their counterparts in the other 49 states and every country except Singapore. Minnesota 8th grade mathematics students ranked in the middle tier of countries on the international assessment and ranked slightly above other 8th grade math students in the United States.

The NEGP suggests that students' success in science "validates the benefits of standards-based reform." Science instruction in the early 90's included factors not present in 8th grade mathematics instruction: high expectations for all students, a curriculum developed by teachers that emphasizes depth over breadth, and consensus among teachers and administrators as to what constitutes good instruction.

Read the full report on Minnesota and TIMMS at http://www.negp.gov/report/mntimss.pdf.

2000 PAEMST Finalists

Congratulations to the following Minnesota teachers who are finalists for the 2000 Presidential Award for Mathematics and Science Teaching:

Elementary:
- Mary Kennedy, McKinley Elementary School, Fergus Falls
- RaNae Nelson, Pearson Elementary School, Wheaton

Secondary:
- Carol Borne, Henry High School, Minneapolis
- Rich Enderton, Minnehaha Academy, Minneapolis
- Don Karlgaard, Brainerd High School, Brainerd

Applications for the 2001 awards are available at the PAEMST web site (www.nsf.gov/PA) and are due February 12, 2001.

Teacher Incentive Grants

Applications are being accepted for 2001 Teacher Incentive Grants. Check the MCTM web site for further information and the application form.

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