



**Network of Urban Mathematics
Education Leaders News
August/September, 2000**

Welcome back to school. We hope you have the best year ever! This month's issue is on assessment in mathematics with some general ideas as well as some specific ones.

We will also address the mathematics teacher shortages in the state.

UPDATES

Core Curriculum Companion

It is my understanding that the Pre k-8 Core Curriculum Companion from the New York City K-8 Math Mentors has been printed by the department and distributed to every district superintendent, teacher center and BOCES. We have at this writing only 400 left over which we are willing to mail out to those requesting them while they last. We ask that you check with your superintendent first about getting copies locally before requesting one. We would like to distribute the ones we have to people who cannot get them any other way. For a copy you may call Jan Christman at 518-474-4922.

Accelerated Seventh Graders

A field memo will be sent shortly to you school administrators that they may allow accelerated seventh grade students to take the Intermediate Mathematics Assessment and/or the Intermediate Science Assessment at the end of seventh grade with the 2001 spring assessment. There will be more details on this in the memo.

Year 2000 Sample Regents Results

Every summer the department calls in a sample of June Regents exams and has them re-scored. This is to check on the accuracy of scoring but also gives us some indication of how this year's regents went using 65 as passing. These are unofficial but are consistent with last year's final results. We still have only a handful of students taking Math A so still do not have a solid idea about it. Later in the year we will know the results for the June, August and January regents combined. For now though here is what we got.

June 2000 Sample Results

| Exam | # Taking | # Passing | % Passing |
|----------|----------|-----------|-----------|
| Course 3 | 5837 | 4322 | 74.0 |
| Course 2 | 7461 | 5480 | 73.4 |
| Course 1 | 12,962 | 8670 | 66.9 |
| Math A | 1377 | 37.4 | 37.4 |

Fall Pre-testing for Math A and B

We are now asking schools to pretest more Math A and B forms this fall. We asking for students who have already passed Math A or the Course 2 or 3 regents exams last June. If your principal gets a letter from us in September please urge him/her to say "yes".

School Accountability

The acronym is SASS for System of Accountability for Student Success. Under this system the Commissioner will annually establish the State school accountability standard in ELA and mathematics for elementary and middle schools. He will also establish adequate yearly progress (AYP) for all public elementary, middle, and high schools that perform below the established State standard. These standards will be based on student achievement results on the state elementary and intermediate ELA and mathematics assessments.

A new School Accountability Performance Index will measure whether elementary and middle schools are meeting their goals or are making progress toward their goals in ELA and mathematics. The Performance Index will be a number from 0-200 and will combine the percentage of students performing at or above Level 2 with the percentage of students performing at or above Level 3. It is a simple addition problem. All you do is add the percent of students at or above Level 1 to the percent of students at or above Level 3.

At the high school level, the accountability system is designed to transition from the old system based on ninety percent of students having met the graduation requirement by the end of grade 11 to one based on a cohort of students who entered ninth grade together in a given year and are still enrolled three years later. There are exemptions for this such as students who left for another school or left the

country. The standard will be that 90 percent of the ninth grade cohort must pass the required Regents exams in English and mathematics within four years. Their yearly dropout rate must be less than 5 percent as well.

I hope to have for you in the September/October newsletter the Commissioners elementary and middle school standards for the 1999-2000, 2000-2001, and 2001-2002 school years. The standard will be higher each year for the next couple of years. Adequate yearly progress targets will be set on a individual basis for school that fail to meet the annual state standards targets. The AYP's will require schools to reduce the gap between their "baseline" performance and the State standard. Schools that exceed their AYP targets by specified amounts and perform acceptably on other measures will be acknowledged as rapidly improving. School s that fail to meet the targets will have a new target set and be required to develop a school improvement plan that is acceptable to the Commissioner.

Results for all schools will be reported annually on the school accountability page of their report card.

THE STATE OF THE STATE

State Math Teacher Shortages by Region

Teacher supply and demand data for 1998-99 is available from the Office of Teaching of NYSED. The tables in their website <http://www.highered.nysed.gov/tcert/sup&dem.html> show regional differences within title groups of thirteen regions of the state. Numbers of teaching certificates issued in 1998-99 (drawn from the Office of Teaching records) are contrasted with the numbers of teachers actually employed in New York State's public schools in October, 1998 (from actual census of school staff). The data will be expanded and upgraded in the near future. Other elements such as student enrollment trends, consumer price indices and links to college program information will be added.

A teacher shortage can be defined from this data as fewer teachers certified in a given geographic area or title group than are needed to fill the public school classrooms. One way to illustrate that is to compare the number of teachers certified to the number of teachers employed. A way of looking at future shortages is to compare the number of teachers over 45 (as they may be retiring within ten years) to the total employed.

The data indicates that none of the regions of the state are looking at increased problems strictly because of excessive retirement aged teachers. Basically the problem is already upon us, not something that is looming in the future. In the table

below I have provided the information that illustrates the present problem and will discuss it in detail.

Math Teacher Shortage Indicators Per Region

| Region | A | B | C | D |
|--------|-----|----|-----|------|
| 1 | 14% | 5% | 1% | 0.18 |
| 2 | 11% | 3% | 2% | 0.14 |
| 3 | 14% | 5% | 1% | 0.18 |
| 4 | 11% | 5% | 1% | 0.15 |
| 5 | 9% | 3% | 3% | 0.12 |
| 6 | 12% | 7% | 1% | 0.16 |
| 7 | 2% | 0% | 21% | 0.07 |
| 8 | 10% | 2% | 2% | 0.13 |
| 9 | 10% | 2% | 2% | 0.14 |
| 10 | 11% | 3% | 2% | 0.14 |
| 11 | 11% | 5% | 1% | 0.14 |
| 12 | 6% | 1% | 2% | 0.10 |
| 13 | 16% | 3% | 0% | 0.20 |

KEY

Regions

1. Black River/St Lawrence (western Adirondacks)
2. Central (surrounding Syracuse)
3. Genesee/Finger Lakes (surrounding Rochester)
4. Lake Champlain/Lake George (eastern Adirondacks)
5. Mid-Hudson (south of Capital District and north of NYC)
6. Nassau-Suffolk
7. New York City
8. Southern Tier Central (Corning area)
9. Southern Tier East (Binghamton area)
10. Southern Tier West (Jamestown-border)
11. Upper Hudson (capital district)
12. Upper Mohawk Valley (Utica/Rome)
13. Western (Buffalo area)

Categories

- A. *Total certificates issued minus number of new teachers as a percent of the total employed*-A low (less than 10% of total employed) or negative number probably indicates a shortage. Teachers may be being "imported" from other regions or out of state. Regions with shortages are: Mid-Hudson, New York City, and Upper Mohawk Valley.
- B. *College recommended certificates minus number of new teachers as a percent of total employed*: Low (less than 5% of total employed) or negative numbers indicate that targeted programs may be needed to fill a region's needs. Regions with shortages are Central, Mid Hudson, New York City, Southern Tier Central, Southern Tier Eastern, Southern Tier Western, Upper Mohawk Valley and Western. This is pretty much a problem for the entire state. In general across the

state more than half the certifications are coming from individual rather than college evaluations.

- C. *Temporary licensees as a percent of the total employed*: Any temporary licensees indicate a shortage. The higher the percent, the worse the shortage. Ten percent or higher is an acute shortage. Most regions had some teachers with temporary licenses but the only region where it is acute is New York City
- D. *Total certificates issued divided by total employed*: The range of this ratio is from zero to one, with the overall State average being 0.22. Ratios higher than the state average indicate possible oversupply, while ratios much lower (less than 0.15) indicate a probable shortage. There appears to be no region with an oversupply of certified teachers in mathematics. The Central, Mid Hudson, New York City, Southern Tier Central, Southern Tier Eastern, Southern Tier Western, Upper Hudson, and Upper Mohawk Valley are experiencing shortages.

For more details, categories and subject areas see the Office of Teaching website given at the beginning of the article. This site also offers information on certification requirements, substitute teacher requirements, where teacher education programs are offered and teacher discipline.

RESOURCES

Alternative Teacher Certification Program

In July, the Board of Regents approved a rigorous alternative teacher certification program designed to attract highly competent people who possess a bachelor's degree with a major in the subject they plan to teach, but initially lack courses in teaching. After completing a rigorous 200 clock hour pre-service program and passing two certification examinations, the candidate in this program can be employed as a teacher and receive daily mentoring and be required to take additional college courses in the field of teaching.

Alternative teacher certification programs may be offered by colleges and universities. For an alternative teacher certification program to be registered with the Department, it will be necessary for the college to partner with one or more school districts to offer such programs. We expect that the colleges will begin to submit applications for alternative teacher certification programs this academic year and begin implementing beginning in the summer of 2001. The Regents believe that the program may be attractive to school districts which are currently experiencing teacher shortages and to colleges which are located in those parts of the state where shortages exist.

Survival Guide for New Teachers

The US Department of Education has developed a "Survival Guide for New Teachers." In this guide first year teachers discuss setbacks, stumbling blocks, the importance of developing relationships with their colleagues, parents, professors, and resources. The guide includes tips and insight from veteran teachers, parents, professors, and administrators. It is available at www.ed.gov/pubs/survivalguide.

Grant for Targeted Instructional Staff Development

At the end of July a Request for Proposals went out from SED for Targeted Instructional Staff Development Grant program which is beginning its third year, with \$10 million provided by the State Legislature. This amount is double that awarded last year. Last year grants were awarded to 30 projects in the state. The grants are competitive. This grant opportunity supports the development of new models of professional development focusing on the implementation of the State standards and assessments and on one or more of the following areas:

1. Effective use of technology in the regular classroom setting;
2. Pre-kindergarten programs approved pursuant to Section 3602-e;
3. Children with disabilities in the regular classroom setting;
4. Non-disabled children who demonstrate the need for increased academic attention;
5. Other areas of need demonstrated by the local district that relate to student instruction.

Date of submission is September 25,2000. For more information contact Laurie Rowe at 518-473-7155. A copy of the RFP can be found at www.emsc.nysed.gov/rscs/.

NYS Academy for Teaching and Learning

If you want some of your teachers to have an opportunity to become part of the statewide peer review process and a member of the NYS Academy for Teaching and Learning have them write up a learning activity and submit it for consideration to the Academy before December 1,200. Teachers will be notified by February 28, 2001 if their activity has been accepted and they will receive an invitation to attend the Statewide Peer Review on March 18-20, 2001 in Albany. There is a specific format that is to be used for the activities. You can contact Ann Schiano or Virginia Hammer at 518-402-5544 for a copy or visit the Academy website at www.nysatl.nysed.gov.

Applications for Presidential Awards

Becoming a Presidential Awardee for Excellence in Mathematics Teaching is a great opportunity for a secondary or elementary teacher. The teacher receives a special citation signed by the President of the United States, a \$7,500 NSF grant to spend on improving their school's mathematics program and a paid trip to Washington, DC for two to attend a special recognition ceremony, meetings with leaders in government and education and workshops to share ideas and teaching experiences. The professional respect that goes with being the state winner of the award opens doors to a number of professional opportunities statewide as well as nationwide.

Surprisingly since PAEMST has gone to self selection the number of applications has dropped significantly. This may be because as Kay Tolliver once told me when she became the Presidential Awardee she never thought she was doing anything special until her supervisor urged her to apply. She is now one of the most respected junior high mathematics teachers in the country. She **was** doing a lot of special things that have now been shared with other teachers through her videos like "Good Morning, Miss Tolliver". My point is that as a mathematics director or supervisor you are in an excellent position to know who the specially talented math teachers are in your district. Encourage them to apply! We have applications and information brochures in the department (jmarcano@mail.nysed.gov) or get them online at www.nsf.gov/PA. The deadline is February 12, 2001. The application entails a lot of work so don't wait until the last minute.

Authors for NCTM 2002 Book

Manuscripts for the National Council of Teachers of Mathematics' 2002 book on integrated mathematics are needed. This should be a natural for New York State mathematics teachers! The goal of this book is to assist teachers in both understanding the nature of teaching mathematics in an integrated approach and providing guidance in planning, implementing, and assessing curricula for integrated mathematics. Manuscripts with examples of successful practice are requested. By reflecting on practice, how does one plan, implement, and assess curricula for integrated mathematics

- As an individual teacher preparing a lesson or unit of study,
- As a group of teachers designing lessons or units within a mathematics department,
- As members of a cross-disciplinary team; or

- As a group of mathematics educators charged with the development of a comprehensive integrated mathematics curriculum?

Other questions include

- Which curricular issues or concerns need to be addressed as one plans for integrating mathematics in elementary school, in the middle school, in the high school, or college?
- What are effective strategies for informing the community, the school board, and parents about integrated mathematics instruction?
- How does the structure of elementary, middle, secondary or post secondary school facilitate or impede the teaching of mathematics in an integrated approach?

For more information see the web site at www.nctm.org/publications/integratedmath.htm

Videos for Professional Development

Do your teachers need to see how to teach standard based lessons? PBS Mathline is offering a free video clip database on the web at pbs.org/teachersource/mathline. The clips show teachers in actual classrooms around the country implementing standards-based instruction. The database puts Mathline's comprehensive collection of videos and lesson plans from kindergarten through grade 12 at your fingertips 24 hours a day.

Viewers can search the entire video library by mathematical topic, teaching strategy, Mathline lesson plan title, and keyword. Search results list relevant clips from one to ten minutes in length that can then be viewed on your computer screen. Viewers also have the option of viewing online the entire video from which the clip was drawn.

Publications

Riptides is a free monthly e-mail news digest from the Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education. It offers timely information about new products, Web sites, workshops, and other items of interest to mathematics and science educators. To view an issue, go to www2.rbs.org/ec.nsf/pages/Riptides.

The Northwest Regional Educational Laboratory's journal, *Northwest Teacher*, presents research-based articles on important topics in math and science education. For single copies and subscriptions contact NWREL at www.nwrel.org/mses/pub.html.

Conferences

Association of Mathematics Teachers of NYS

This is the most important conference of the year for mathematics educators in New York State. I cannot

urge you enough to attend and to send some of your teachers. The date will be **October 26-29, 2000**. The location is *The Nevele Grande in Ellenville, NY*.

A particularly popular feature is the minicourses offered through out the conference. They generally last for half a day. The minicourse offerings include the following titles:

- Implementing the NYS Core Curriculum-Tracking a Key Idea (K-6)
- Math You Can Make-Guaranteed to “Peas” (4-8)
- Make a Tetrahedron Kite out of Straws and Tissue Paper (6-12)
- Graphing Calculators-For the Beginner (9-12)
- A Potpourri of Hands-on Activities (1-4)
- Getting Started with the TI-73, a Middle School Graphing Calculator (5-8)
- Making Manipulatives Meaningful: Cuisenaire Rods, Pattern Blocks, Concrete Graphs, Etc. (K-3)
- Do You Think You Can “Figure It Out”? (3-6)
- Hands to Head: Middle School Manipulatives (609)
- Inspiration-Using Concept Maps in the Classroom (9-12)
- Fascinating Kaleidoscopes for Exploration of Math/Science Concepts (3-8)
- Mathematics of the Human Body, A TI-83/CBL Exploration (6-12)
- Using CABRI Geometry (TI-92) to Demonstrate Basic Algebra Concepts (7-10)
- NSF projects as possible math programs mini-showcase (all levels)

You must sign up for minicourses and workshops in advance of the conference. Early registration ends on October 4, 2000.

For registration materials contact Barbara Stewart (716-245-5391) for hotel reservations contact the Nevele Grade Resort (800-647-6000).

NUMEL

Our next meeting will be held at the above conference on **October 26 from 1 PM to 5pm** in the **Festival Room** of the old Nevele building.

Registration forms will be sent out next month. No reimbursements for this meeting but if you are going to AMTNYS anyway (and you should), there is no additional cost.

NYS K-8 Math Mentors

This is a group of about 80 mathematics leaders from all over the state whose goal is to help their region or district implement the state mathematics standards. It is a DDE Title IIA project run out of SUNY New Paltz. They meet twice a year and their next meeting

will be at the AMTNYS meeting starting on October 26 in the morning and will met periodically through out the conference.

NYS Association of Mathematics Supervisors

This is a group of folks like yourself who are district or building mathematics coordinators, supervisors, or directors. They will have their annual breakfast meeting on the morning of October 27 at the AMTNYS conference. If you would like to join, look for their table near the registration desk for the AMTNYS meeting.

National Summit on Recruiting, Hiring, Training and Retaining Quality Teachers will focus on best practice solutions in four key areas: recruiting, hiring, training and retaining quality teaching staff. It will be held in Anaheim, CA on November 8-10, 2000. For more information contact the Performance Institute at 703-519-6270 or visit their website at www.PerformanceWeb.org.

National Associations of African American Studies and Hispanic-Latino Studies

They will hold a joint annual conference in February 2001 in Houston, TX. The themes will be addressing multicultural differences and establishing equitable learning opportunities for all students. Educators of all levels who wish to participate in forums on these topics should contact Charles E. Mitchell, Dept. of Mathematics and Physics, Box T-0470, Tarleton State University, Stephenville, TX 76402; e-mail Mitchell@tarleton.edu; fax (254) 968-9534 by September 15.

Improving America’s Schools

The U.S. Department of Education will hold three regional conferences on Improving American’s Schools during the fall of 2000. The east coast conference will be December 13-15 in Washington DC. Registration for the conference is \$250. For more information, contact IAS, 555 E. Constitution, #208, Norman OK 73072; phone 800-203-5494; e-mail ias_conference@ed.gov; or see their Web site, www.ncbe.gwu.edu/iasconference.

Internet

- Eric Weisstein’s World of Mathematics is a comprehensive, interactive online mathematics encyclopedia, searchable by either keyword or topic. Mathworld.wolfram.com
- Zone 101 is a collection of free mathematics lessons for grades 4-8. www.zone101.com
- MAA Online: Career Profiles is a collection of essays, written by people who use mathematics on the job, that describe why a background in

mathematics is useful. Good opportunity to address the state's CDOS standards!
www.maa.org/careers/index.html.

- Questions and Answers on AIS.
<http://www.emsc.nysed.gov/>
- Essential Elements of Standards-Focused Middle-Level Schools and Programs.
<http://emsc.nysed.gov/ciai/pub/>
- Learning Standards and Alternative Performance Indicators for Students with Severe Disabilities.
<http://web.nysed.gov/vesid/se/lrnstdi.htm>.
- Core Curricula, resource guides and assessments (all past Math A regents available here).
<http://www.emsc.gov/ciai/>
- Limited English Proficiency/ESL.
<http://www.nysben.org/>
- Preschool Planning Guide and Early Elementary Resource Guide.
<http://www.emsc.nysed.gov/ciai/pub/>
- Sharing Success (successful educational programs and practices).
<http://www.sharingsuccess.org/>
- Special Education.
<http://web.nysed.gov/vesid/special.html>
- Part 100 of Commissioner's Regulations Relating to General Education and Diploma Requirements.
<http://www.emsc.nysed.gov/part100/opener.html>
- "Helping Your Child Learn Math" (2nd edition) offers various activities for families to help elementary school-aged children learn & apply mathematical concepts in useful and fun ways.
<http://www.ed.gov/pubs/parents/Math/index.html>
- The US Department of Education has developed a Teacher Quality Website. This website provides information on such issues as professional development opportunities, recruitment of teachers, raising standards, classroom resources, research and much more.
www.ed.gov/inits/teachers/index.html.

BOARD OF REGENTS

July Actions

- Approval of the proposed amendment to Section 21.2 of the Rules of the Board of Regents to implement Chapter 405 of the Laws of 1999 to define the courseware and other content-based instructional materials in an electronic format that shall be considered textbooks for the purposes of computing textbook aid and loaning textbooks to resident students.
- Approval of the proposed amendment to Section 100.3 of the Commissioner's Regulations to

change the date from November 2000 to November 2001 for administration in grade 5 of the new State elementary assessment in social studies. The amendment also requires districts to retest fifth grade students who scored at Level 1 of the State designated performance level on the ELA and/or mathematics elementary level assessments administered in grade 4. Such students must receive at least one semester of academic intervention services and be retested using multiple sources of evidence, including, but not limited to, a commercial or other external test determined by the school district to be a valid and reliable means of evaluating a student's progress in achieving the elementary level State learning standards in these subjects.

FEATURE ARTICLE

Assessment in Mathematics

A definition of assessment used by the Mathematical Sciences Education Board is "the process of collecting information for decision making" (p. 4, MSEB). They also state that decision makers need to understand that-

- "different information needs may require different assessments and that one assessment cannot serve all needs;
- multiple sources of information lead to better informed decisions;
- traditional tests of achievement are only incomplete measures of overall knowledge and capabilities; and
- potential unfairness to an individual or a specific group of people can result if decisions are based on assessment of performance without assessment of equity of opportunity to learn."(MSEB, 16)

The National Council of Teachers of Mathematics in their 1989 *Curriculum and Evaluation Standards* gave five purposes for assessment: grading, diagnostic, instructional feedback, generalized mathematical achievement, and program evaluation. As mentioned above the assessment that is used is dependant upon the type of information you are trying to find.

Grading assessments are summative indicators. They answer the questions of how well the student understood and integrated the material taught, whether the student could apply his or her learning in other contexts, and how well the student is prepared to move to the next level of instruction. As most teachers do, a number of measures should be used to determine a student's grade. They could include written tests that present problems with a range of difficulty based upon the expectations for the course,

extended problem solving projects, papers or written arguments that demand thoughtful inquiry about a mathematical topic, and oral presentations.

Diagnostic assessments are used to determine what the student understands about a concept or procedure, what aspect of problem solving is causing the student difficulty, and what might account for the student's unwillingness to attempt new problems or see the application of previously learned materials. These types of assessments are what would be used to determine what a student would need to receive help with in Academic Intervention Services. Some methods of diagnostic assessment are teacher observation, oral questions that ask students to explain their procedures, focused written tasks and directed test items.

Instructional feedback is a way of monitoring of how instruction is going for the student. It tells the teacher whether the students understand the lesson, are ready to proceed to the next idea, the pacing of the instruction is appropriate, students understand the connections among ideas, and can apply their learning to new situations. This feedback takes place before, during and after instruction. Before instruction the teacher needs to know if students have the background for the day's lesson. Many mathematics teachers accomplish this by utilizing a "Do Now" procedure where they give the students a couple of questions to answer when they first get to class. The students' answers or lack thereof helps the teacher determine where to start the lesson. Most teachers ask questions of the students during instruction. However, many of the questioning techniques I see being used will not generate useful feedback to the teacher. Many times the questions are at a low recall level and students just call out answers in a chorus. This tells the teacher nothing about how well students understand. It only tells that some students are paying attention. Class discussions that include questions that require students to give extended responses are more likely to provide the teacher with instructional feedback. Some teachers stop occasionally in their lessons and ask students to write what they understand so far in their journals. Most teachers use homework as after lesson feedback. But quizzes or summary activities could also be used.

Generalized mathematical achievement assessments are normally in the form of standardized tests. Students can be compared to each other or norm referenced or they can be compared to a standard. These assessments are often used to identify students who are at different levels of achievement. The state mathematics assessments compare the student to the standard and are used to identify which students are in need of academic

intervention services. Many districts use a commercial standardized test for the grade levels that do not have a state test to determine if students who have not already been identified should be or if those who have been identified have made sufficient progress. In last month's newsletter we told what standardized tests many of the urban districts around the state are using so I will not repeat that here.

Program evaluations need to be compared to the instructional program and provide information on how well the program is meeting its goals. The tasks reflect the intent of the curriculum goals, and should be aligned to the instructional methods and content of the curriculum. Some common methods for obtaining the information include student interviews, performance tests, criterion-referenced tests, observations of class discussions, and the success of students who have completed the program. The state education department uses building results on the elementary and intermediate mathematics tests for the purpose of evaluating the effectiveness of Pre K-8 programs and the cohort data for grades 9-12.

District Assessment Programs

A district assessment program would probably include several components such as district-wide, course-wide and classroom assessments. I am going to present a possible model for these that many districts are adopting and make some suggestions on how to utilize these assessments to support students with the state assessments. Please realize these suggestions only come from what I see school districts and teachers already doing that seem to hold promise. They do not represent a policy of the state education department nor do I have any data that they actually make a difference. They just seem like logical ideas to me.

District-wide

Every district has by now notified the state of their district wide assessment method for identifying students in need of academic intervention services. This was part of their academic intervention plan which was submitted to the department in August. This included some method for identifying students that may be encountering difficulty before fourth grade. Many commercial tests do not go below third grade because they are paper and pencil tests. Many early childhood educators do not believe that paper and pencil tests are appropriate ways to measure achievement of children below grade three. Often interviews and observation of concepts and skills in the form of check off lists or narratives are used. In later grades districts usually purchase the services of a commercial assessment firm or utilize a standardized test that will give them reports in a form that is useful to teachers, guidance, and parents.

Course-wide

In large urban districts there is a movement now to have district-wide midterms or quarterlies and final exams for each course in the high school. This does not seem as prevalent in the elementary and middle schools but should probably be considered. The content of each test is known by the teachers well in advance. The tests serve a couple of purposes: 1. Monitors student progress through the course, 2. Acts as a “heads up” to difficulties a student may encounter on the state assessment while something can still be done to address the difficulty, and 3. Ensures that the entire curriculum is “covered” in every classroom by controlling the course pacing.

In order for these assessments to act as a “heads up”, they should probably assess what is tested on the state tests and match those tests in format meaning that there are some multiple choice and some student constructed response items. For grades up to 8, the tests should be 100% in context but for the high school about 50-60% in context. They should be based on a district curriculum that is aligned with the state standards in mathematics. They should also include the cognitive processes that the state tests include. The chart below gives the percent of each test which will assess each cognitive process.

| Cognitive Process | Elementary | Intermediate | Math A |
|----------------------|------------|--------------|--------|
| Procedural Knowledge | 40-50% | 30-40% | 30-40% |
| Conceptual Knowledge | 25-40% | 25-40% | 25-40% |
| Problem Solving | 15-30% | 25-35% | 25-35% |

Procedural Knowledge is demonstrated in mathematics when students select and apply appropriate procedures correctly; verify or justify the correctness of a procedure using concrete models or symbolic methods; or extend or modify the procedures to deal with factors inherent in problem settings. Procedural knowledge includes the various numerical algorithms, the ability to read and interpret graphs and tables, and perform non-computational skills such as rounding and ordering.

Conceptual Knowledge is demonstrated in mathematics when students provide evidence that they can recognize, label, and generate examples and non examples of concepts; use and interrelate models, diagrams, manipulatives and varied representations of concepts; identify and apply principles; know and apply facts and definitions; compare, contrast and integrate related concepts;

recognize, interpret, and apply the signs, symbols, and terms used to represent concepts. Conceptual understanding reflects a student’s ability to reason in settings involving the careful application of concept definitions, relations, or representations of either of them.

Problem Solving requires students to use their accumulated knowledge of mathematics in new situations. Students are expected to recognize and formulate problems; determine the sufficiency and consistency of data; use strategies, data, models, and relevant mathematics; generate, extend, and modify procedures; and use reasoning (i.e. spatial, inductive, statistical or proportional) in new settings.

One of the unfortunate by products that I have seen as a result of district-wide quarterlies has been the amount of time used for review. I have found teachers in some schools spending a week or more reviewing for a quarterly exam. If you are considering the exam as a way of monitoring progress, I think that review should not take more than one class to prepare students for what the items will look like and what topics will be included. Last minute cramming will give a teacher a false picture of what students have actually internalized and are likely to remember at the end of the year. The time might be better spent re-teaching all areas that students appeared to be weak in from the test and not spending time on what they clearly already know.

Individual Classroom

Every unit or chapter test should probably include two or three student constructed response questions similar to those on the state assessments. The questions should include the content of the chapter or unit. Old state assessments and the many state assessment review books that are now available can provide appropriate items. I recommend only a couple of these items per test so that the tests won’t be excessively long and so the test can cover more content. Scoring student responses with rubrics is more time consuming than correcting right or wrong answers so we want to make it possible to get papers back to students in a timely manner by limiting how many of these items are included on any one test.

Giving students the opportunity to revise and resubmit their work on these questions will give them an opportunity to understand what is required of them to write a full credit response.

The New Standards Project has come up with a model that might be helpful to teachers in deciding how to respond to student work so they can revise it. They suggest separating student work into two basic categories: Ready for Revision and More Instruction Needed. Papers in the same category are

handled in the same way. The chart below shows how it can be utilized.

| Category | Characteristics | Instructional Response |
|-------------------------|---|--|
| Ready for Revision | Response is complete and correct. Student received full credit | Student has final score and no revisions are necessary. |
| | Student did not receive full credit because there were minor problems with the response. Written feedback is all student will need to correct the flaws. | Feedback is written but does not tell student how to fix the flaw only points out where it is. Give student an opportunity to revise and resubmit for increase in score. |
| More Instruction needed | Response has evidence of inadequate learning. Written feedback will not be enough for student to correct response. | Teacher may need to re-teach students making same errors or have student explain work so teacher understands what the difficulty is. After instruction student has opportunity to revise and resubmit response for increase in score. |

Tips for Preparing Students for the New Assessments

Some of the things districts are doing to help prepare their teachers and students for the new state assessments might be some help to you.

- Blow up posters of the rubrics for all classrooms and use them daily.
- Hold strategies workshops where teachers review assessments and standards. Discuss classroom strategies that will reach the standards.
- Build in more work on rubrics and revising.
- Build and revise standards based learning units including, but not limited to parallel tasks.
- Develop parent and Board awareness of test format and expectations.
- Increase modeling of standards based lessons in classrooms.

- More turnkey training, with full expectations that teachers bring back information and then teach others as turnkey trainers.
- Train administrators on the nitty-gritty of assessments
- Conduct “exit interviews” with students after administering a sample test.
- Conduct curriculum alignment and gap analysis
- More emphasis on early intervention
- Use additional personnel, where available, to support standards work individually with students
- More timed activities to get students used to shorter problem solving sessions.
- Freeing up additional staff for direct student support
- Provide more release time for collegial leaders
- Ten session workshop to create performance based assessment tasks
- Create teacher dialogues, sharing across districts
- Take school board members through test. This is a more informative activity than just telling them about it.
- Take parents through assessments and articles about the standards.
- Emphasize higher order thinking skills, not just rote memory.

Dealing with Poor Results

Here are some questions teachers could ask themselves if their students’ results in a building were disappointing. Answers to these questions might provide some insight on what a school building needs to consider in order to provide students with more support for next exam.

- Did you follow a curriculum aligned with the state mathematics curriculum?
- Did you have enough time to do everything?
- What do you need (5-10 things) for your students to walk in the door with when then walk in the door in September (e.g. graphing calculator).
- Do your tests and assignments reflect the format of the state assessment? What should it look like?
- Did you look at what your last year’s students had trouble with?
- Have you taught your students strategies for comprehending the problems they must solve?
- Have you modeled the problem solving process for your students?
- Have you shown your students multiple ways of representing their math concepts?

This is far from an exhaustive list but may help a building get started thinking about things that could be done to get better results.

Resources for Assessment & Data Analysis

Books

Bernhardt, Victoria. *Data Analysis for Comprehensive Schoolwide Improvement*, Larchmont, NY: Eye on Education.

This is an excellent book for beginners and those interested in a broad overview of the many possible sources of data that must be reviewed in systematic planning. The author has a web site (<http://eff.csuchico.edu>) where readers can access surveys and additional materials.

Bernhardt, Victoria. *The School Portfolio: A Comprehensive Framework for School Reform*. Larchmont, NY: Eye on Education.

This book details how a school can systematically collect data that provides evidence that can be used to manage systemic, long-range planning.

Clarke, David (1997). *Constructive Assessment in Mathematics: Practical Steps for Classroom Teachers*. Berkeley, CA: Key Curriculum Press
Interesting and practical steps teachers can take to improve their assessment of students' learning of mathematics are outlined in this book.

Stenmark, Jean (Ed.) (1991). *Mathematics Assessment: Myths, Models, Good Questions, and Practical Suggestions*. Reston, VA: NCTM

This is my all time favorite book on math assessment. It is short, easy to read, and gives examples of multiple assessments. I think every math teacher should have a copy of this book!

Teddie, Charles, & David Reynolds (Eds) *The International Handbook of School Effectiveness Research*. Taylor & Francis, Inc.

This book focuses on the questions raised by research into what constitutes effective schooling around the world. It will provide readers with background and questions that can focus their own research and data analysis.

Web Sites

- www.WestEd.org/lfs. *LEARNING FROM ASSESSMENT: Tools for Examining Assessment Through Standards*. Offers opportunities for teachers to examine the interrelationships between assessment, standards, and instruction in order to improve student achievement in mathematics. Items from large-scale assessments (TIMSS, NAEP, etc) are used as focal points for discussing critical issues that support student learning.
- www.WestEd.org/asds. Assessment and Standards Development Services. Provides tools

for development, implementation and evaluation of standards and assessments, as well as evaluation of research methods and systems.

- <http://assessment.wested.org/ppad>. This is a relatively new site produced by the ten regional education labs. It provides an easy connection to all ten labs' assessment material, including toolkits on assessment, software, how-to guidebooks, audio and videotapes on assessment, and workshops on assessments, as well as links to other sites.
- www.astd.org. American Society for Training and Development. This site is broader than just education, focusing on evaluation in the workplace, planning, learning, and performance. It is an excellent resource for schools interested in benchmarking, as well as general information on data analysis.
- www.horizon-research.com. Horizon Research, Inc. I have referred you to this site before for protocols for evaluating classroom instruction. There are other surveys and data collection ideas for math and science here as well.
- <http://crest96.cse.ucla.edu>. National Center for Research on Evaluation, Statistics, and Student Testing. A well respected center for basic research on testing issues, from reliability and validity of new test formats through advanced articles on the use of data. This group was involved in our new state assessment system in the beginning stages.
- www.nces.ed.gov/nationsreportcard/site/home.asp. This is where to go for statistics on the National Assessment of Educational Progress. Our new assessments use a similar model for reporting student scores.
- <http://nces.ed.gov/nationsreportcard/ITMRLS/intro.shtml>. The Sample Question Tool (SQT) has become very popular because it provides easy access to questions, scoring rubrics, state performance on the questions, and actual student responses on the NAEP questions. Questions can be selected by content classification and by difficulty.
- www.programevaluation.org. New York State Teacher Resource and Computer Training Centers. This site, sponsored by the NYS Teacher Centers, focuses on program evaluation, and is a good source for teachers interested in action research, and for anyone interested in program evaluation at a basic level.
- www.rand.org/centers/education/aboutnav.html. Rand Foundation focuses on important policy issues, from government issues through education issues. They provide accurate data and analysis of education policy. Of special interest

are materials on assessment and accountability, evaluation of school reform, and teachers and teaching.

- <http://nces.ed.gov/pubsearch>. Student Data Handbook for Elementary, Secondary, and early Childhood Education:2000 Edition. This is an electronic catalog. You will need to enter “Student Handbook”. Their site offers a downloadable publication that provides excellent guidance on maintaining student information.
- <http://ericae.net>. United States Department of Education’s ERIC Clearinghouse on Assessment and Evaluation. This is an excellent source for extending data analysis and research, including an excellent new guide and information on topics from component re-testing through portfolios.

QUERIES

Are sequences still required in mathematics? If so, what constitutes a Regents mathematics sequence?

This year’s 9th graders (entering freshmen in September 2000) are the last students to have a sequence. A Regents mathematics sequence for them requires a 65+ score on the following combinations of Regents examinations.

- Courses 1,2, and 3 or
- Math A and Course 3 or
- Math A and Math B.

Starting with next year’s 9th graders (entering freshmen of 2001), there is no mathematics sequence requirement. All students must earn three units of credit in mathematics. A unit of credit is earned by completing a unit of study with a passing grade.

Please send queries to Dr. Carolyn Richbart, School Improvement Team, EBA 467, NYSED, Albany, NY 12234. Or crichbar@mail.nysed.gov.

NEED TO REACH US?

There have been some staff changes in Regional School Services that you should know about. They are due to retirements and resignations. I will give you the name and phone number of the person taking over for those who have left.

| Former | Responsibility | Present | Phone |
|----------------|---------------------------|--------------------------|--------------|
| Sue Updike | Central Liaison | Mark Barth | 518-474-5923 |
| Leon VanDyke | Long Island Liaison | Wendell Harris | 518-474-5923 |
| Dick Jones | Coordinator for SIT | Jim Viola | 518-474-5923 |
| Zenobia O’Neal | Coordinator for Comp. Ed. | Tom Orsini, Betty Garcia | 518-474-7928 |

ENCLOSURES

None

NEXT ISSUE

1. Manipulatives
2. Implementation of the math standards in NYS urban schools