

KY MATH SMART

STRATEGIES, MANIPULATIVES, ASSESSMENT, RESOURCES
AND TECHNOLOGY FOR KENTUCKY'S MATH EDUCATORS

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Don't forget:

- *KCTM/T³ conference in Lexington, October 19-20, 2007. See <http://www.staff.fcps.net/bperry/t3conf2007/> for details.*
- *CEC conference in Louisville, November 18-20, 2007. Contact your Director of Special Education for details.*
- *National Math Recovery Conference in Newport, KY April 15-18, 2008. More information later.*

Take “Add+Vantage” of your Math Consultants

How many ways can your students “show five”? Do they count the dots on the dice or do they just know how many there are? Can they tell you instantly what comes before 30? Does a student who can count-on when adding really understand quantity? These seemingly simple skills and others form the basis for numeracy. Students with numeracy weaknesses will struggle throughout their math career.

A house built on a weak or shaky foundation may look stable, but with use it will collapse. Numeracy is the foundation for math. Older students struggling with alge-

braic thinking, measurement, data and statistics or even basic facts are probably standing in the middle of a math house with an inadequate foundation.

In September 2007 five math consultants and others spent four intense days and nights learning that the development of early numeracy counts and is very complex. They learned the pedagogy behind numeracy and discovered how to assess it. Then they took their new found skills to an elementary school and assessed a willing group of first grade volunteers. Afterward they viewed and coded the tapes. Finally, they engaged in data-

driven instructional design by creating student profiles and developing differentiated activities to meet student needs.

Several consultants are looking for classrooms to practice their new found skills. They are also partnering with the Kentucky Center for Mathematics (KCM) located at Northern Kentucky University to offer training for teacher teams in the Add+VantageMR frameworks for assessment and instruction. Watch for more details in coming newsletters. At the time of publication funding and possible locations across the state are (continued on page 3)



Liz Brewer, math consultant from Caveland, uses Number Norm to create an activity to reinforce numeracy.

CLOSING THE MATH GAP—THE RESULTS ARE IN

How do teachers close the math achievement gap between students with and without disabilities? What do they do in the classroom that works? In the spring of 2007 the math consultants surveyed the ten elementary, ten middle and ten high schools that were closing that gap based on the previous year's assessment data.

The results have been analyzed and common practices discovered. Turn the page to discover tried and true ideas for your classroom.

The following schools are to be commended for completing the survey last year, but especially for closing the gap! Morgantown Elementary, Jones Park Elementary, Dawson Springs, Highland Ele-

mentary, Olive Hill Elementary, South Edmonson Elementary, Manchester Elementary, Allen Central MS, Betsy Lane, Johnson Co MS, Edmonson Co MS, Munford MS, FT Burns, MS, Johnson Central HS, Lone Oak HS, Highlands HS, Greenwood HS, Simon Kenton HS, Mason Co HS, and South Oldham High School.

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KY MATH SMART

STRATEGIES

The top schools surveyed indicate the frequent use of differentiated instructional interventions in the classroom. Over half of the elementary schools surveyed frequently use readiness, adapting content, adapting process, adapting products, scaffolding instruction and implementing developmental variations. Several teachers specifically mention using SRA Number Worlds and SRA Corrective Math. Matching learning styles to activities and

using manipulatives or hands-on instruction are listed with constant practice.

Over half of the middle schools surveyed frequently use the same methods as the elementary schools, with over 77% of them frequently adapting the process. Scaffolding instruction, providing manipulatives and trying different ways until finding the method that clicks for a student were specifically mentioned.

87% of the high schools sur-

veyed adapt content, while 83% adapt process and 77% scaffold instruction. A common thread at the high school level is using writing or talking to justify answers and to explain the process. High school teachers also report that it is important to make the connection from the classroom to the real world. Finding those applications is key to student success.

Finding the right strategy for your classroom is key to your students' success!



Warren County Math Coach, Alice Cantrell demonstrates SmartBoard applications related to Numeracy.

"If you think dogs can't count, try putting three dog biscuits in your pocket and then giving Fido only two of them."
~Phil Pastoret

MANIPULATIVES

Using manipulatives is frequently mentioned by the top schools. Seventeen of the nineteen high school teachers surveyed use manipulatives no more than once or twice a week. Twelve of the eighteen middle school teachers use them at least once or twice a week. While 41% or 18 of the elementary school teachers use manipulatives daily and another 27% use them three to four times a week.

Regardless of grade level or

frequency of use, manipulatives are a part of these successful classrooms. Manipulatives can be purchased or home-made, high tech or no tech. Students should be encouraged to use manipulatives as long as they are needed for math success. Remember that every student does not learn in the same way or at the same speed, so allow individuals to seek their own level of usage. As a student's mathematical confi-

dence increases their reliance on the manipulative will automatically fall away.

Consider this. Young children often use a security blanket, teddy bear, binky or some other "manipulative" to help them feel secure and safe as they begin to explore the world. A math manipulative is a security blanket that helps a student move from the concrete into the abstract world of numbers. Eventually, the manipulative will be replaced with more sophisticated strategies. How many seniors carry a blanket at graduation?



Regardless of the type of assessment, if you aren't using your assessment to drive your instruction, why are you assessing?

ASSESSMENT

If assessment drives instruction, what type of car are you driving? When surveyed, over 50% of the high schools with the smallest math gap indicate the use of standardized tests, curriculum based measurement, self or peer assessments and hands-on math investigations to drive instructional planning. Over half of the middle school teachers reported using curriculum based measurement and hands-on math investigations

to influence their make instructional decisions. The elementary teachers indicated that their instructional planning was influenced by curriculum based measurements, group projects, self or peer assessments, and hands-on math investigations.

When considering assessment options, don't forget quick and easy formative assessments. An exit slip, appropriate questioning, agree/

disagree cards or thumbs up/thumbs down responses provide a wealth of information at point of need for the teacher. Knowing exactly what students understand and don't understand right now tells the teacher where to go and what to change tomorrow or even in the next five minutes. Almost every professional development session repeats the mantra "assessment drives instruction". It really is that simple!



While at the KY Center for Mathematics, Math Consultants, Karen Campbell, Gwen Morgan and Tammy Wall check KCM's website for numeracy activities. To see what they found, go to: www.kentuckymathematics.org

RESOURCES

The common thread among teachers at the top surveyed schools, regardless of grade level, is that they seek out and attend professional development. Many mentioned trainings offered by their special education and regular education cooperatives. ARS/PIMSER, located at the University of Kentucky, is also mentioned. Sessions on math software, math assessments and textbooks is frequently mentioned. Attending district, regional and state con-

ferences/trainings is key. Several high school teachers mentioned the importance of attending AP (advanced placement) workshops.

An interesting aspect is that all of the professional development mentioned as being significant was not necessarily math related. Time was spent on writing, open responses, curriculum training, analysis of student work, closing the gender gap, engaging ESL students, using technology, differentiated instruction, Thought-

ful Ed, Discipline with Dignity, direct instruction and even National Board Certification process.

Kentucky schools closing the math gap with disabilities are focused on the whole student. In the math classroom, math is not the be all and end all. Successful math teachers are successful teachers—period. They seek out professional development and networking possibilities that will strengthen the whole teacher to teach the whole child.

TECHNOLOGY

The use of technology in the math classroom changes yearly, if not monthly. Over half of all surveyed teachers, regardless of grade level use videos or United Streaming less than weekly. More than half of middle and high school teachers surveyed report using interactive websites and interactive math software less than weekly. The majority of the elementary teachers surveyed report using interactive websites and interactive math

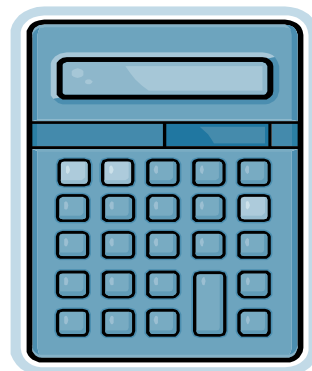
software once or twice a week. These teachers are using technology to enhance instruction.

High schools mention the daily use of graphing calculators. PowerPoint, document cameras, SmartBoards and other projector based technology are also used almost daily.

While cost is often a prohibitive factor with technology, numerous grants are available.

More often, time to research what is new stands in the way. Conferences often bring in vendors who are more than happy to show off all of their new “techie toys”. Don’t get caught up in the hype. Look at the specific needs of your students and your technology comfort level. Remember that there are many people in your district more than willing to help you include more technology in your daily lessons.

Regardless of the type or complexity of the calculator, make sure students practice with the same type of calculator they will use in assessment. Testing is not the time for them to have to learn how to use a specific calculator.



CONFERENCES AROUND THE STATE

- KCTM/T³ conference in Lexington October 19 and 20 at Henry Clay High School.
- CCTM conference November 8, 2007 at North Laurel HS in London, KY. Contact Deborah S. King at McCreary Central HS for details.
- Council for Exceptional Children Fall Conference in Louisville at the Galt

House, November 18-20, 2007. Check out the sessions on algebra and collaboration.

“Add+Vantage”

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being discussed for trainings in 2008. Until then, make sure you take advantage of your math consultant for numeracy activities that are appropriate in your classroom. Also consider applying for a Mathematics Achievement Grant from the Kentucky Department of Education to place a full-time primary Mathematics Intervention Teacher in your school (the RFA should be available after mid- to late October).

“Arithmetic is numbers you squeeze from your head to your hand to your pencil to your paper until you get the answer.”

~Carl Sandburg, from “Arithmetic”

Kentucky's Special Education Cooperative Math Consultants

Kentucky's Special Education Cooperative Math Consultants are here to serve you. Contact your district's Director of Special Education if you need assistance from a math consultant. The math consultants and math contacts for each Cooperative are listed below.

Tammy Wall—**Big East Educational Cooperative**

Liz Brewer—**Cavland Educational Cooperative**

John Beardsley—**Central Kentucky Cooperative**

Connie Wilson—**Jefferson County Exceptional Child Educational Services**

Gwen Morgan—**Kentucky Valley Cooperative**

Marinell Kephart—**Northern Kentucky Cooperative**

Carrie Bearden—**Ohio Valley Cooperative**

Karen Campbell—**River Region Cooperative**

Cheryl Lancaster—**Western Kentucky Cooperative**

Belinda Bowling—**Wilderness Trail Cooperative**

Connie Brookins—**Upper Cumberland Cooperative**

Connie Hunt—**Upper Cumberland Cooperative**

Student Challenge to Reinforce Order of Operations:

Write the numbers 1-10. Have students use four 4s to arrive at each number. They may add, subtract, multiply, divide, and use powers and roots. Choose based on ability level. There are multiple solutions possible. Need more of a challenge—find solutions for 11-20, use nine 9s or five 5s, use another set of numbers (use the digits in their phone number or the numbers that correspond with the letters in their name— $a=1$, $b=2$, etc). The options are endless. No guarantee that every set you choose will have a solution, but isn't the purpose to get the students to practice order of operations and play with numbers? Play on!

MATH IN THE NEWS $1+2+3+4+5+6+\dots$ Math is SUM thing—honest, it all adds up!

Kentucky Center for Mathematics

If you have not taken time to check out the Kentucky Center for Mathematics located at Northern Kentucky University do not pass go, do not stop, detour or put it off one more minute! I know, your class is at the other end of the state or even if you are close enough to drive, you don't have the time or energy to go there after school. No more excuses; math assistance is available at the touch of a mouse.

Their website at www.kentuckymathematics.org is a treasure trove of information for math teachers, students and parents. Are you out of graph paper? You can

download it here! Are you in need of virtual manipulatives for use in a center or to introduce a concept to the whole class? This is the place to go! Are you in need of the perfect lesson for a sub or yourself and you are fresh out of ideas? This is the location for you! Are you in the dark regarding standards or the ever changing graduation requirements? Here are the answers! Are you so new to math that you don't even know the questions to ask? Consider yourself at home!

Consider the Kentucky Center for Mathematics the clearinghouse for all of your Kentucky math needs and their website is your portal. Drop by to visit, search, explore, and play.

One suggestion—set a timer because you will lose track of time! There's so much to see and do.

A Good Read

Looking for a great book for fall? How Many Seeds in a Pumpkin? by Margaret McNamara and G. Brian Karas is a charming book that intertwines counting, estimation, multiplication, ordering, and grouping with a science lesson (I learned something new about pumpkins!) and tops it off with a reminder on self-esteem. It's a must get for the classroom. Look for it at your local bookstore or at www.randomhouse.com/kids. It is published by Schwartz and Wade Books in New York.



The outside of a pumpkin can help predict how many seeds are found within. Read How Many Seeds in a Pumpkin to learn how.