Winter 2010-11


EXAMINING MATHEMATICS COACHING

# Coaching Chronicles

**News and Events for EMC Project Participants**

**In This Issue:**



## The PI's Corner: What Is Standards-Based Mathematics?

BY ELIZABETH BURROUGHS

The EMC Project focuses on coaching in mathematics content and instructional strategies that are "research-based, reform-based, and standards-based." Being research-based simply means we ground instruction in strategies shown through research to be effective. But what does it mean to be "reform-based and standards-based"?

Today's use of the term "standards-based" originated with the 1989 release of *Curriculum and Evaluation Standards for School Mathematics* by the National Council of Teachers of Mathematics (NCTM). The *reform* focused on five major shifts in classroom instruction:

1. classrooms are viewed as "mathematical communities" rather than a collection of individuals;
2. logic and evidence, not teacher authority, are used to verify results;
3. instruction emphasizes reasoning, not memorizing;
4. lessons focus on making conjectures and solving problems, instead of procedural answer-finding; and
5. teachers make connections among concepts, ideas, and applications, rather than present isolated concepts.

Instruction patterned after these fundamental principles is generally called "reform-based" or "standards-based," even as the focus on standards-based instruction has evolved. NCTM updated its standards in 2000 with *Principles and Standards for School Mathematics,* which is the foundation EMC uses as we work with coaches on instructional strategies and mathematics content. This document defines standards in five content areas, though EMC focuses on content in the single area of number and operations, with a more specific emphasis on the development of concepts of rational numbers, ratio, and proportion in grades K-8. (That's why EMC observers ask to see a lesson in the area of number and operations when we visit our teachers' classrooms once a year.)

*Principles and Standards for School Mathematics* also sets standards for five mathematical processes: communication, connections, problem-solving, reasoning and proof, and representation. We're working with coaches on understanding these five processes, and we notice how they're present in teachers' classrooms when we visit.

Meanwhile, the application of standards continues to expand. Earlier this year, the Common Core State Standards Initiative released its K-12 standards in mathematics, which NCTM endorsed following its own advisory role in the development of these new standards. Among the seven states represented in our project, Colorado and Wisconsin already have adopted the Common Core standards as their state standards. Idaho, Montana, Nebraska, North Dakota, and Washington are currently considering that possibility.

The purpose behind the standards-based movement is to raise the bar for student performance above arithmetic or symbolic skills, to strive for greater equity in public education, and to enhance curricula to prepare students for the new millennium. Through your teaching of standards-based mathematics as part of EMC, you continue to make a profound difference in our profession. Thank you, and happy holidays! ▲

**Dr. Elizabeth Burroughs**
**EMC Co–Principal Investigator**
**Montana State University**

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# "Teacher Needs Inventory" Can Facilitate Focused Coaching

Are you, as a teacher, getting the most out of sessions with your instructional coach? Do you, as a coach, feel that you're giving assistance where it's truly needed? One tool that can help with both objectives is the EMC "Teacher Needs Inventory" (TNI), which all EMC teachers recently completed for use in the coming year's coaching sessions.

Developed by EMC Principal Investigator David Yopp a few years ago for another project in Idaho, the TNI helps teachers rate their confidence level in 21 areas of their mathematics teaching. Teachers also identify whether or not they would like to partner with their coach on each topic. Although the survey isn't intended to cover every possible aspect of classroom teaching that could be covered in coaching sessions, it can be a great start toward building an ongoing dialogue between a coach and teacher. Furthermore, the TNI is one of several instruments that EMC researchers compile and track throughout the five-year research study.

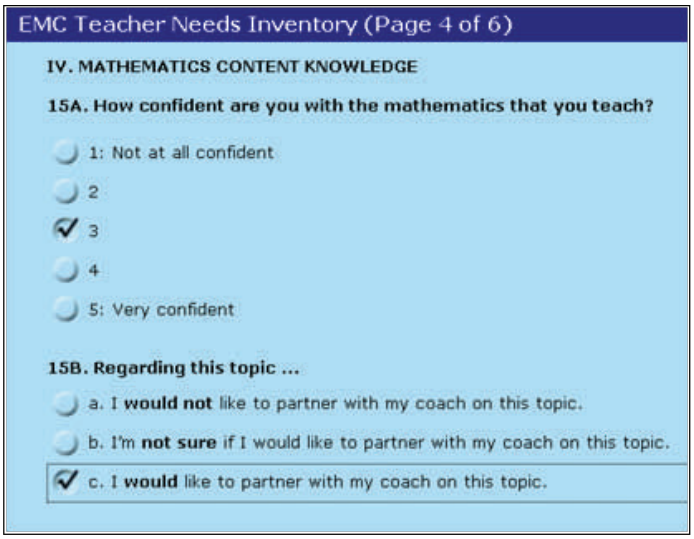
Yopp originally developed the survey for coaches who were having trouble getting coaching conversations started at all. "With the TNI, coaches could say, for example, 'I see you indicated that you want some help with implementing mathematics investigations in your class. Would you like to work on that with me?'" Yopp says. "Later, coaches could say, 'I see you feel more confident this year with mathematics investigations. What helped you make those changes in your classroom?'"

In Year 1, EMC coaches administered the TNI on paper to each of their teachers. This fall, the project sent out an electronic survey to each teacher in an attempt to simplify the collection process. The result was exactly the opposite for some teachers.

Project Director James Burroughs says that some school districts' e-mail servers wouldn't allow teachers to submit their surveys easily by e-mail, so many teachers were frustrated by the multi-step process. "I didn't foresee that problem, and I'm very sorry for the extra effort it required from some teachers," he says. "But everyone was very determined and helpful all around. Our teachers really came through." One-hundred percent of EMC's teachers completed the survey, he adds.

Already the project has improved the way it will administer the survey in the future. Beginning next spring, teachers will take the TNI online at the *end* of each school year at the same time as their other annual assessments, with their TNI responses pertaining to the *following* year's coaching sessions.

That way, coaches will have each teacher's survey responses, in the form of a condensed report *(left),* for use by the first week of school in the fall. Coaches attending professional development next summer also will receive training on how to use the TNI. "It'll help get coaches and teachers on the same page from day one," Burroughs says. ▲


EMC Teacher Needs Inventory (Page 4 of 6)

IV. MATHEMATICS CONTENT KNOWLEDGE

15A. How confident are you with the mathematics that you teach?

- 1: Not at all confident
- 2
- ☑ 3
- 4
- 5: Very confident

15B. Regarding this topic ...

- a. I **would not** like to partner with my coach on this topic.
- b. I'm **not sure** if I would like to partner with my coach on this topic.
- ☑ c. I **would** like to partner with my coach on this topic.

**KEY:** Teachers rated the following 21 questions on **a scale from 1 to 5, with 1 meaning *not at all confident* and 5 meaning *very confident*.** Teachers then indicated whether or not they would like to partner with their coach on the particular topic, or that they are unsure.

I. TEACHING CONCEPTUAL AND INQUIRY-BASED LESSONS

1. How confident do you feel incorporating investigative, inquiry-based or discovery-based mathematics learning into your lessons?
   **3 ... I DO want coaching**

2. How confident do you feel using instructional strategies that are likely to increase students' mathematical conceptual understanding or problem-solving abilities?
   **4 ... I'm not sure if I want coaching**

3. How confident do you feel engaging students in mathematical abstraction and sense-making (including symbol use, theory building, and justification and reasoning)?
   **3 ... I DO want coaching**

4. How confident do you feel using cooperative learning?
   **4 ... I'm not sure if I want coaching**

**Beginning next fall, each EMC coach will receive a "Teacher Needs" summary report like this one for each teacher coached in the project.**

## Keeping in Touch with EMC

We send you several important e-mails throughout the year. Please be sure that our e-mails make it to your in-box and not your junk mail! (It may help to add emc@math.montana.edu to your address book.) If you ever have any changes to your e-mail address, your name, your school location, or your home mailing address (where we send your stipends), please send us a quick note to let us know. *The Post Office will* not *forward stipend payments from an old address*. ▲

## EMC COACH PROFILE: CINDY WHITE

**Name:** Cindy White
**District:** Pocatello/Chubbuck School District No. 25, Pocatello, Idaho
**EMC Teachers:** Susan Chandler, Chubbuck Elementary; Carol Hicks, Indian Hills Elementary; and Marci Reddish, Indian Hills Elementary.
**Family:** "I've been married to my husband, Darin *(pictured),* for almost 26 years. We have three children: Tyler, 24 (and his new wife, Maritza), Trevor, 21, and Tanisha, 16."
**Years as a teacher:** 23, all at Tyhee Elementary in Pocatello.
**Years as an instructional coach:** 3
**What do you find most rewarding about being a coach?** "I really like working closely with individual teachers. I find it so rewarding when my teachers try new things with their students and are excited to share what their students have accomplished. It's so exciting to work with teachers who are excited about teaching math, and students who love math!"
**Favorite pastimes away from school:** "When my world isn't revolving around football or track (we're avid fans of both), I love to go camping, fishing, and hiking with my family."
**One personal or professional goal for 2011:** "Providing support for K-6 teachers can be quite overwhelming from a math curriculum perspective. I'm working on building my understanding of what mathematical concepts are critical for teachers at each grade level, so I can more effectively help my teachers focus on what's really important." ▲

## Did You Know?

The EMC Project recently added two coaches and six teachers in the Papillion-La Vista School District in Papillion, Nebraska. That brings the total number of states with EMC participants to *seven*: Colorado, Idaho, Montana, Nebraska, North Dakota, Washington, and Wisconsin.

# Coaches Stay Connected with Monthly "Moodle" Activities

As of this fall, all EMC Project coaches have access to our online professional development "Moodle" site: moodle.math.montana.edu. Coaches who attended mathematics content professional development last summer, either in Bozeman or in Denver, can continue the conversations we started by considering monthly topics and readings posted on Moodle.

"Participating in these discussions is a great way to stay in contact with your EMC coaching cohort and EMC professional development leaders," says Elizabeth Burroughs, EMC co-PI, who coordinates the Moodle site with EMC researcher Jennifer Luebeck, both of Montana State University. "Even spread among seven states, we can still work together as a group and learn a lot from one another."

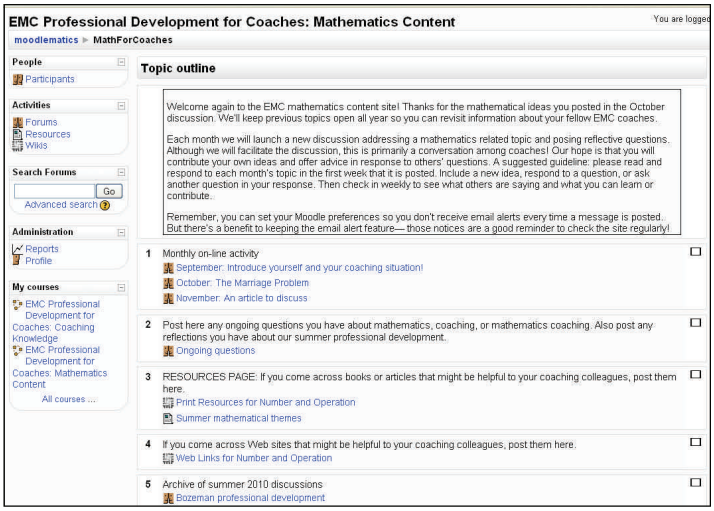
In addition, coaches scheduled for professional development in 2011 also have monthly topics and readings available to start their focus on coaching knowledge. "We can use this opportunity to establish our network of coaches well before we work together next July," Burroughs says.

Check in often! As a group, EMC coaches have a wealth of knowledge and diverse experiences that all coaches can share to make their work with teachers more productive.

On the Moodle site, coaches can:

- Ask and answer questions about mathematics content;
- Ask and answer questions about coaching mathematics;
- Share resources you've found valuable;
- Ask your EMC colleagues to recommend resources; and
- Participate in discussions about mathematics and coaching that are posted by the EMC professional development leaders each month.

"We look forward to seeing everyone online as we start the new year," Burroughs says. ▲




**The EMC Moodle site is a central meeting-place for coaches that features monthly discussions, resources, and a forum for coaching questions.**

# Effective Coaching Rooted in Content, Research Shows

**By David Yopp**
**EMC Principal Investigator**

Recent research has shown that the most effective coaching is content-based. Lockwood, McCombs, and Marsh (2010) found evidence that reading coaches, through their work with teachers, improved student reading achievement. The researchers also looked at mathematics achievement scores for the same students because state assessments involved mathematics tasks with a significant amount of reading, such as application problems. They conjectured that improving reading instruction would also somewhat improve instruction in mathematics that involved reading (and would, in turn, improve mathematics achievement).

Interestingly, they found that wasn't the case. But the lack of evidence in mathematics achievement does *not* suggest that mathematics coaching isn't effective. Instead, it suggests that for coaching to be effective, it should target specific subject content.

Other recent works about coaching take this content-focused approach. In *A Guide to Mathematics Coaching* (2009), Hull, Balka, and Miles define a mathematics coach as someone versed in mathematics and pedagogy who works with teachers to improve student mathematics learning. The authors demonstrate how a coach can ground coaching on pedagogical topics, such as making student thinking visible, in the content of mathematics learning.

This approach is similar to my own experience as a mathematics coach. Even when coaching on issues that seemed common to all subject areas, such as classroom management, I always found ways to center my efforts upon the content being taught. For example, the teachers and I often found that classroom management issues could be addressed by presenting students with more challenging and engaging mathematics tasks. In this way, we could improve both the classroom culture and the content of the classroom simultaneously. So regardless of the exact coaching topic, my constant refrain was: *How will this coaching session improve student learning of mathematics?* ▲

## EMC TEACHER PROFILE: CANDICE BRANDON

**Name:** Candice Brandon
**School:** Aurora Hills Middle School, Grade 7, Aurora, Colo.
**EMC Coach:** Ken Jensen
**Principal:** Darla Stumpp
**Family:** "My husband, Will. We've been together for 12 years but just got married this past September."
**Years as a teacher:** 5
**What's one way that your coach has helped you in your mathematics classroom?** "Ken is great at giving me constructive feedback that's conducive to my style. I'm short, sweet, and to the point, and after a few years of working together, Ken knows just how to cut to the chase for me. Also, he isn't offended by my direct form of communication."
**Favorite pastimes away from school:** "Reading. Also volunteering at The Dumb Friends League, an animal welfare nonprofit based in Denver."
**One personal or professional goal for 2011:** "Personal—take a great honeymoon! Professional—more effectively implement the MYP (Middle Years Program, part of International Baccalaureate) philosophy in my daily lessons." ▲

## Project Evaluators to Contact Coaches

The EMC Project's external evaluators, Martha (Marty) Henry and Keith Murray of M.A. Henry Consulting, St. Louis, will begin contacting EMC coaches in January as part of their routine evaluation activities. Sometime between the first of the year and later in the spring, coaches should expect to be contacted either by e-mail or telephone to talk about their experiences with the project. The evaluators also welcome your questions about project evaluation at any time. Feel free to contact them at mahenry@mahenryconsulting.com. ▲

# Food for Thought

In each issue of the newsletter, we share a different problem with you to challenge your own thinking about mathematics (and to have some fun). Here's one for this issue:

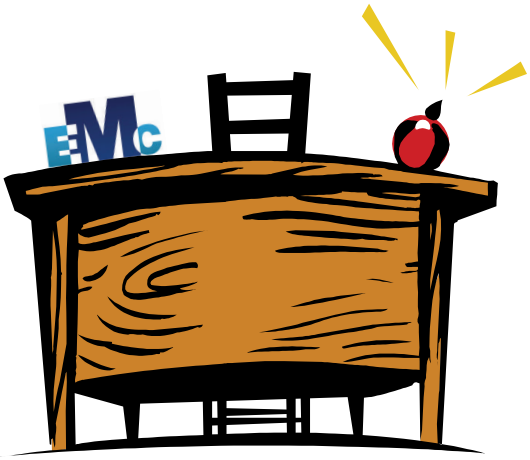
The sum of three numbers is 100. The ratio of the first to the second is 3/5; the ratio of the second to the third is 5/12. What is the second number?

*Go to the "Participants" page on our Web site to read the solution, or* CLICK HERE. ▲

# Your EMC Calendar for 2011: An Exciting Year Ahead!

Along with your many other mathematics teaching goals for the coming year, you'll be taking part in continuing EMC activities in the second half of the 2010-11 school calendar. Here's a quick snapshot of what's coming up.

**Coaching sessions continue.** Project coaches should continue toward the goal of completing a total of *eight* three-part coaching sessions with each project teacher during the 2010-11 school year, or about one per month. Four of these sessions should cover mathematics content focused on number sense and operations. A single coaching session using the EMC model is made up of a pre-observation conference, an observation or model lesson, *and* a post-observation conference. Be sure to keep notes, which will help you fill out the EMC Coach Reflection and Impact Survey at the end of the year. Questions? Contact James Burroughs toll-free at (877) 572-5032, or by e-mail: emc@math.montana.edu.



**Online coaches' forum activities continue.** Coaches will be continuing activities on their EMC "Moodle" site in the coming months. *(See related article on page 3.)*

**Evaluators begin routine survey of coaches.** EMC's external evaluators, Marty Henry and Keith Murray of M.A. Henry Consulting, St. Louis, will begin contacting EMC coaches by e-mail or phone in January as part of their routine evaluation activities. *(See page 4.)*

**Teacher observations start in March.** Next spring, EMC Project observers will again contact all teachers to arrange a classroom observation at the teacher's convenience. These observations are separate from coaches' classroom observations and occur only once each year. *(See "Teacher Observations: What Are They For?" in the Fall 2010 newsletter on the EMC Web site.)*

**Assessments return in May.** Like last spring, project teachers will take all of their online assessments near the end of the school year. (Thank you for completing them promptly, before school finishes!) The usual $100 stipend will apply. In addition, coaches will complete the "Coach Reflection and Impact Survey," which reviews the year's coaching sessions.

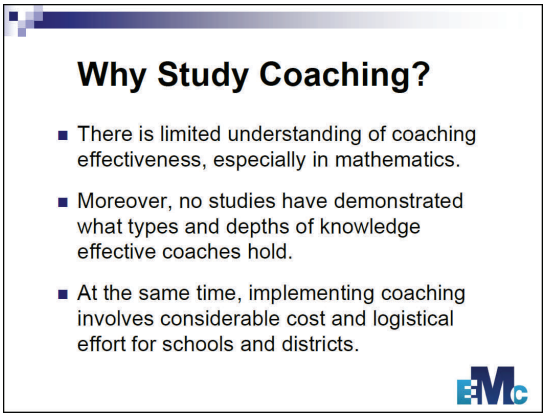
**PD for Group 2 Coaches.** In July in Bozeman, Mont., coaches in "Group 2" will receive their EMC professional development in coaching knowledge. All coaches have confirmed their dates, but contact James Burroughs with any questions. ▲

# Researchers Talk About EMC Nationwide

As part of their early efforts to disseminate EMC Project goals and results to scholars and educators, the EMC Research Team has traveled coast to coast in 2010 to discuss the project with interested audiences.

Earlier this month, project staff made a presentation at the National Science Foundation Discovery Research K-12 Program PI meeting in Washington, D.C. Other meetings in 2010 where EMC researchers have presented include the Nebraska Council of Teachers of Mathematics Conference in Kearney, Neb.; the National Council of Teachers of Mathematics Regional Conference in Denver; the National Council of Supervisors of Mathematics Conference in San Diego; the Association of State Supervisors of Mathematics Conference in San Diego; the American Evaluation Association Conference in San Antonio; and the Association of Mathematics Teacher Educators Conference in Irvine, Calif. Researchers also are preparing papers for publication.

"The NSF expects all funded projects to share project findings with researchers, policy makers, and practitioners," says John T. Sutton of RMC Research Corp., EMC co-PI, who made several presentations this year. "What's more important for EMC, however, is the opportunity to inform and impact teachers, administrators, schools, and teacher educators around the country using our findings. What EMC participants contribute to the educational community as a whole is incredible, and the benefit to teachers and students is far-reaching. So we have an obligation to them to get this information out to a wider audience."



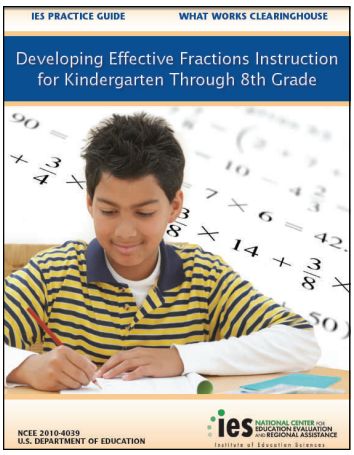

**Many EMC presentations, such as the one that contained this slide, stress the importance of studying coaching.**

EMC participants can view these presentations and more on the "Results" page of the EMC Web site. ▲

# Resource Roundup: Tools You Can Use

In each issue we'll share some great resources that may assist you in your daily coaching and teaching. If you have other favorites, we'd love to hear from you!

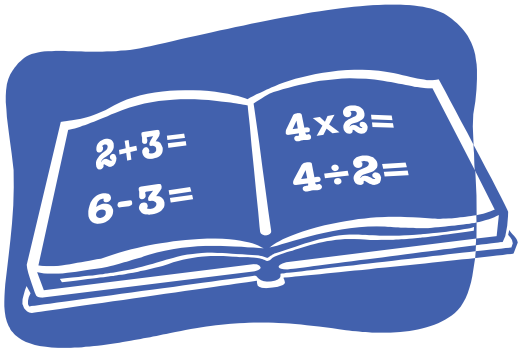
● *Developing Effective Fractions Instruction for Kindergarten Through 8th Grade,* by Robert Siegler et al. U.S. Department of Education, Institute of Education Sciences (2010).




This 90-page practice guide, available as a free download on the IES Web site, offers evidence-based recommendations for improving students' understanding of fractions, computation with fractions, and the more advanced topics of ratio, rate, and proportion.

● *Content-Focused Coaching: Transforming Mathematics Lessons* by Lucy West and Fritz Staub. Heinemann (2003).

This influential book includes three CDs of video showing the authors engaged in actual pre- and post-observation conferences with teachers.




● One set of resources that can help you refine your teaching in standards-based mathematics *(see page 1)* is a new series released by NCTM this year.

The *Developing Essential Understanding* series, available at the NCTM Web site, highlights important content and strategies for teaching various topics and includes these volumes, among others:

*Developing Essential Understanding of Number and Numeration for Teaching Mathematics in Prekindergarten–Grade 2;*

*Developing Essential Understanding of Rational Numbers for Teaching Mathematics in Grades 3-5;*

*Developing Essential Understanding of Ratios, Proportions, and Proportional Reasoning for Teaching Mathematics in Grades 6-8.* ▲

EXAMINING MATHEMATICS COACHING

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