The Main Idea's PD Suggestions for *Five Easy Steps to a Balanced Math Program*

Assess Where Your School is in Developing a Balanced Math Program

To introduce the *Five Easy Steps* program to your staff, give your teachers the opportunity to look at how far along your school already is in implementing the five steps by having them rate aspects of your math program like those below (modify this as needed).

A SNAPSHOT OF WHERE WE ARE IN DEVELOPING THE FIVE COMPONENTS OF A BALANCED MATH PROGRAM
Rate each from 1 – 4 on the line provided: 1 = Not started 2= Beginning 3 = Developing 4 = Well established
Students regularly review math concepts and skills they already learned ___ Students regularly practice mental math ___ Rather than just teaching procedures, teachers also teach students to use number sense and assess the reasonableness of the answer ___ Students have regular practice solving problems with multiple steps and can communicate the process they use to solve such problems ___ Teachers at our school focus on conceptual understanding ___ A clear timeline has been established for when should learn which math facts ___ Math teachers come together to design common assessments, and score and analyze the results of those assessments ___

Next, have your teachers discuss the results from above, plus the following questions (all from the book) in small groups. Organize teacher comments by using a large piece of newsprint with 5 headers for each of the 5 steps, and record teacher comments under the appropriate step. Use these comments to plan where you will start in implementing the five steps. This may be a lot to cover, so choose the questions you'd like to focus on for this session.

In what ways are you helping students retain math concepts and skills they have already been taught?
How are you helping students develop and refine their number sense?
How will you assess for learning (gather information about student mistakes and misconceptions in order to differentiate instruction)?
How are you providing students daily mental practice with number sense?
How are you providing opportunities for students to apply and explain their mathematical reasoning?
What is conceptual understanding? Why is it important in mathematics? How is conceptual understanding different from procedural understanding?
How do students learn their math facts? How should *they learn them? Is there a timeline for when students should learn all their math facts?*
Do you have an accountability system in place so that students not only learn but also retain their math facts?
How are you assessing the effectiveness of math instruction within your grade level, department, school, or district throughout the school year?
How frequently are you collecting student data from math assessments, and how are you using this data to improve student achievement?

Experience the Math

If math teachers do not have experience with any of the five steps, it is helpful for them to experience that step as if they were students. For the first PD session, tap a teacher or administrator who is strong in teaching problem solving, or incorporating mental math, or any of the other five steps. Ask that teacher to prepare several mental math problems or a problem-solving task. The problems should be fairly basic – the goal isn't to stump teachers but to introduce a few of the five steps. Have the facilitator bring the other teachers through the activity (teachers can even do the problem-solving task cooperatively to experience group work!) and the *processing* of the activity. This way, teachers can better understand some of the challenges their students face. It's a great idea to begin math PD sessions by actually having teachers *do* some math. A common complaint about professional development is that it is often content-less (that is, it is about differentiation or cooperative learning but there is no specific content). For each math PD session ask a different math teacher to bring in two sample mental math problems and a problem-solving task that would be appropriate for the grade he or she teaches. Teachers can come up with ideas on their own, or search the web (just type in "problem solving in math" or something similar or use some of the web resources in the book: mathforum.org, puzzles.com, Aunty Math Challenges, etc. They can also get problems from books -- books by Marilyn Burns (grades 1 – 8), Crossing the River with Dogs (9th grade and up), and many other books.)

Plan and Observe a Demonstration Lesson

Modeling is a powerful way to develop your math teachers. The following is time consuming, so you may only have time to do part of it. Have a teacher who is experienced in unit planning lead a group of math teachers through the process of planning a conceptual unit. The facilitators of these small groups should make copies of the blank template for unit planning in the back of the book or create a blank one based on the sample unit in the summary on p.5.

1. The facilitators should bring *samples* of various standards and the "unwrapped" skills and concepts that go along with them. See an example of these concepts and skills in the sample unit on p.5 of this summary. The facilitator should demonstrate this "unwrapping" for the standards to be used in the unit to be planned. Then the facilitator should use the concepts and skills in a knowledge package cluster (p.5 of the summary) to help teachers identify the Big Ideas.
2. Next, the facilitator should model how to write Essential Questions from looking at the Big Ideas. The facilitator should bring in sample Essential Questions to give teachers an idea of what these questions might look like (such as: *What kinds of questions can be answered with data displays? How does the type of data influence the choice of graph? How can objects be represented and compared using geometric attributes? When is estimation more appropriate than finding an exact number? How do we use equations and inequalities to model situations and solve problems? How do we use technology to examine functions?*).
3. Finally, the facilitator should demonstrate how to plan an End-of-Unit Assessment and an accompanying Scoring Guide/Rubric. This is a lot, so perhaps the facilitator would do this over the course of several PD sessions *or* just choose to model one aspect of the unit.
4. *Next*, the facilitator should demonstrate how to plan a single lesson, with Math Review and Mental Math (both aligned to the skills and concepts in the unit) as well as time to work on the Conceptual Understanding Unit. Rather than the facilitator simply walking the teachers through the steps of planning this lesson, the teachers should be involved in co-planning the lesson. *Then*, the facilitator should actually teach this lesson to students while the other teachers get coverage so they can observe. Note, it is fine for the facilitator to pause during the lesson to say, "Excuse the interruption, but what I am doing right now…" to explain an aspect of the lesson to the observers.
5. It would be helpful for the teachers to be able to debrief and assess what happened after this lesson.