

## NCSM Summer 2014 President's Newsletter Article Mathematical Goals: The Alpha and Omega of Effective Practice

I've never seen a lesson-planning template of any length without a section where the teacher could list their mathematical goals. Even those oversized brown *Daily Lesson Planners* that I used to get each Fall, with five boxes/week for lesson plan notes, had a spot for goals to be recorded. Recently online I found lesson planners that had even smaller spots for goals than I remembered and they tended to be labeled, "Obj. Code". While it is reassuring to see

The image shows a page from a spiral-bound notebook titled "LESSON PLANS". At the top right, it says "SEMESTER \_\_\_\_\_ Week of Yr \_\_\_\_\_". The page is divided into two main sections, one for "MONDAY" and one for "DAY". Each section contains a table with three columns: "SUBJECT:", "OBJ. CODE:", and "SUBJE" (likely Subject). Below these columns are rows for "Activities:", "Materials/Resources:", "Evaluation:", and "Re-Test:". The "MONDAY" section is partially filled with handwritten text, including "Activities:", "Materials/Resources:", "Evaluation:", and "Re-Test:". The "DAY" section is empty.

evidence of the belief that identifying learning goals is important, this example also illustrates, at least metaphorically, the concern I want to explore in this article, that daily lesson planning goals are too often trivialized and rarely carefully considered. They tend to be narrowly focused on procedures and/or assumed to be equivalent to the lesson title in the textbook. Given the changes we hope to make in teaching and learning with the

introduction of new college and career ready standards, I would argue that now is the time to take a second look at something we agree is important, but rarely pause to thoughtfully consider. This discussion is particularly strategic because as we work to implement new standards, a critical lever for improved student achievement can be helping teachers learn to more purposefully consider, craft, and then use their daily lesson goals. This apparently simple act of identifying mathematical goals can be an influential factor driving achievement gains because, like the locus of a circle, each decision point of a lesson should satisfy or support the lesson goals. The tasks we select, the way we choose to launch the lesson, the way we group students, the way we support learning during an exploration, and the way in which we choreograph the summary of a lesson, to list just a few examples, all need to equate with the *details* of our mathematical goals. The better the goals, the better our instructional decisions can be, and the greater the opportunity for improved student learning.

### Details that make a difference

As with so many things, it is the details that make a difference and critically influence outcomes. Daily lesson plan goals need to intentionally reference more than skills and procedures. The following typical goals are all important, but they each address only one dimension of mathematical knowledge.

Students will

- find the next term of a pattern and describe how the pattern grows
- solve ratio problems
- simplify rational expressions with exponents

In the era of the Common Core, standards include words and phrases like: *understand, make sense of, look for and identify mathematical structure, connect mathematical ideas across multiple representations*. These dimensions of mathematical proficiency also need to be visible in our daily lesson planning goals so that they can influence a host of instructional decisions as well as the learning opportunities that will flow from them. My *current thinking* is that teacher's daily mathematical goals need to be constructed to:

- focus more intentionally on the mathematical concepts and practices rather than exclusively on procedures (as illustrated in the examples above),
- be specific enough that teachers can effectively gather and use information about *student's current thinking to make* effective instructional decisions, and
- be understood to sit within a trajectory of connected mathematical goals and lessons that span days, weeks, and/or years to offer students a more coherent view of mathematics.

As an exercise for yourself, or with a colleague, consider the ways in which these mathematical goals have been revised to focus on conceptual understanding, reference specific key strategies or ways of thinking, and position the mathematics within a constellation of related ideas.

	<b>Typical lesson planning goals</b>	<b>Revised lesson planning goals</b>
Upper Elementary	Students will find the next term of a pattern and describe how the pattern grows	Students will recognize and describe multiplicative relationships building on what is understood about additive relationships in appropriate growth patterns
Middle School	Students will solve ratio problems	Students will use unit rates to compare and answer questions.
High School	Students will simplify rational expressions with exponents	Students will understand what influences the sign of simplified rational exponential expressions

Next, compare the instructional decisions you might make with the goals on each side of the table and as you do, consider how the revised goals would influence the mathematical tasks you select, what you would listen for as students explain their thinking or for help, and which pieces of student work you might select to discuss during the summary of the lesson. I would argue that the differences are

dramatic and have the potential to significantly impact instruction and achievement. Further, it is hard to imagine how students will achieve the kind of mathematical competency described in standards such as the Common Core State Standards, if teachers' lesson planning goals exclusively support procedural knowledge.

True, these revised versions of mathematical goals won't fit in the spot for the "Obj. Code," in the Daily Lesson Planner, but they do have the potential to influence instructional decisions in ways that will better support a) the implementation of standards that include a balance of procedural, conceptual and mathematical practice goals, b) "understanding in mathematics", and c) offer students a more coherent mathematical experience both within a lesson and across lessons.

### **Shifting practice**

As leaders, there are many opportunities to push teacher's thinking around lesson goals and to help them add greater focus, balance, and coherence. Curriculum implementation work, coaching, lesson study in PLCs, grade level planning, course planning, school improvement, and formative assessment discussions are just a few of the contexts in which a discussion of more effective goal setting would be relevant and productive. The next time you visit a classroom, don't just check to see if mathematical goals are written or posted on the board, read them carefully and begin a conversation regarding the nature of the mathematics represented in the goals, the level of focus, and the ways in which they do or do not connect to prior knowledge and lessons.

Mathematical goals mark the starting and finish lines for daily lessons by framing learning opportunities and generally marking learning boundaries. They are the alpha and omega of effective practice and student achievement. Given their powerful influence in teaching and learning, it is time we moved them out of that little spot in the planning book, and offered them our careful and deliberate attention.