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Why Identify Curriculum Focal Points?

The National Council of Teachers of Mathematics produced Principles and Standards for School Mathematics (NCTM 2000) to update and extend the recommendations for learning and teaching mathematics that had appeared in Curriculum and Evaluation Standards for School Mathematics (NCTM 1989), Professional Standards for Teaching Mathematics (NCTM 1991), and Assessment Standards for School Mathematics (NCTM 1995). Principles and Standards enunciated the Curriculum Principle, which states, "A curriculum is more than a collection of activities: it must be coherent, focused on important mathematics, and well articulated across the grades" (p. 14). Specifically, "a well-articulated curriculum gives teachers guidance regarding important ideas or major themes, which receive special attention at different points in time. It also gives guidance about the depth of study warranted at particular times and when closure is expected for particular skills or concepts" (p. 16).

This definition of curriculum articulation echoes a central question that occupies state and local leaders in mathematics education: What mathematics should be the focus of instruction and learning at particular grade levels of the pre-K–12 educational system? As Principles and Standards states, "Those who design curriculum frameworks, assessments, instructional materials, and classroom instruction based on Principles and Standards will need to make their own decisions about emphasis and order" (p. 31). Curriculum Focal Points for Prekindergarten through Grade 8 Mathematics provides one possible response to the question of how to organize curriculum standards within a coherent, focused curriculum, by showing how to build on important mathematical content and connections identified for each grade level, pre-K–8.

Inconsistency in the Placement of Topics by Grade Level in U.S. Mathematics Curricula

Analysis of curricula of countries participating in the Third International Mathematics and Science Study (TIMSS [1997]; now known as the Trends in International Mathematics and Science Study) led to the familiar description of school mathematics in the United States as "a mile wide and an inch deep" (Schmidt, McKnight, and Raizen 1997). In addition, research on the curricular expectations of states and school systems across the country indicates inconsistency in the grade placements of mathematics topics, as well as in how they are defined and what students are expected to learn.

State and local districts, with varying resources for providing leadership in mathematics education, have been working fairly independently to develop student learning expectations, as required by the federal law No Child Left Behind (2002). The result has been a wide variety of mathematics curriculum standards, with little consensus on the placement or emphasis of topics within specific grade levels (Reys et al. 2005). For example, in a study of the mathematics curriculum standards of ten states (Reys et al. 2006), the total number of grade-level expectations in mathematics for grade 4 ranged from 26 to 89 (see table 1).

Table 1. Number of Fourth-Grade Learning Expectations (LEs) per State by Content Strand (from Reys et al. 2006, p. 20)

	Number & Operations	Geometry	Measurement	Algebra	Data Analysis, Prob & Stat	Total Number of LEs
California	16	11	4	7	5	43
Texas	15	7	3	4	3	32
New York	27	8	10	5	6	56
Florida	31	11	17	10	20	89
Ohio	15	8	6	6	13	48
Michigan	37	5	11	0	3	56
New Jersey	21	10	8	6	11	56
North Carolina	14	3	2	3	4	26
Georgia	23	10	5	3	4	45
Virginia	17	8	11	2	3	41

The Importance of Curricular Focus in Mathematics

Many factors have contributed to the need for a common mathematical focus for each grade level, pre-K–8. These include the increased emphasis on accountability testing, high levels of mobility of both students and teachers, and greater costs of curriculum development. A focused, coherent mathematics curriculum with a national scope has the potential to ease the impact of widely varying learning and assessment expectations on both students and teachers who relocate. In addition, a focused curriculum would allow teachers to commit more time each year to topics receiving special emphasis. At the same time, students would have opportunities to explore these topics in depth, in the context of related content and connected applications, thus developing more robust mathematical understandings.

In a survey of employees of forty-seven educational agencies—those responsible for improving curriculum and instruction in their states—85 percent of the respondents indicated that "national leadership is needed to assist in future articulation of learning expectations in mathematics, particularly from national professional organizations of mathematics teachers (K–12 and university) and mathematicians" (Reys et al. 2005, p. 17). This publication addresses that need.