

Key Shifts in the CCR Standards for Mathematics

Through their selections, panelists validated three key shifts in instruction prompted by the Common Core State Standards (CCSS) and outlined by Student Achievement Partners (2012). The shifts described below identify the most significant elements of the CCSS for Mathematics. At the heart of these shifts is a focus in mathematics instruction on delving deeply into the key processes and ideas upon which mathematical thinking relies. The shifts below therefore center on the knowledge and skills students must master to be adept at understanding and applying mathematical ideas.

Shift 1 – Focus: *Focusing strongly where the standards focus*

Generally speaking, instructors need both to narrow significantly and to deepen the manner in which they teach mathematics, instead of racing to cover topics. Focusing deeply on the major work of each level will allow students to secure the mathematical foundations, conceptual understanding, procedural skill and fluency, and ability to apply the math they have learned to solve all kinds of problems—inside and outside the math classroom. This important shift finds explicit expression in the selection of priority content addressing a clear understanding of place value and its connection to operations in the early levels. The emphasis on numeracy in early grades leads to a deeper understanding of the properties of operations at subsequent levels, encouraging fluency in the application of those properties, eventually for all operations with all number systems in a variety of situations.

Shift 2 – Coherence: *Designing learning around coherent progressions level to level*

The second key shift required by the CCSS and reflected in panelists' selections is to create coherent progressions in the content within and across levels, so that students can build new understanding onto previous foundations. That way, instructors can count on students having conceptual understanding of core content. Instead of each standard signaling a new concept or idea, standards at higher levels become extensions of previous learning. The focus on understanding numbers and their properties through the levels also exemplifies the progression from number to expressions and equations and then to algebraic thinking. This is seen in the selected standards within and across the levels. For example, an emphasis on understanding place value, as indicated above for Shift 1, progresses to using place value to add and subtract two-digit numbers to fluency in addition and subtraction of whole numbers to 1000 (including a requirement to explain why the strategies for addition and subtraction work). An understanding of both the numbers and their operations grows from the emphasis on place value and follows a progression extending beyond operations with numbers to include algebraic expressions and equations and ultimately to a deep understanding of functions. These connections can be further exemplified in applications related to other domains within and across the levels, such as the connection between properties of operations (e.g., multiplication) and geometric applications (e.g., area).

Shift 3 – Rigor: *Pursuing conceptual understanding, procedural skill and fluency, and application—all with equal intensity*

The third key shift required by the CCSS and reinforced in panelists' selections is equal measures of conceptual understanding of key concepts, procedural skill and fluency, and rigorous application of mathematics in real-world contexts. Students with a solid conceptual understanding see mathematics as more than just a set of procedures. They know more than “how to get the answer” and can employ concepts from several perspectives. Students should be able to use appropriate concepts and procedures, even when not prompted, and in content areas outside of mathematics. Panelists therefore selected standards reflecting key concepts used in a variety of contexts, such as place value, ratios and proportional relationships, and linear algebra. They also selected standards calling for speed and accuracy in calculations using all number systems, as well as standards providing opportunities for students to apply math in context, such as calculations related to geometric figures involving rational number measures; calculation of probabilities as fractions, decimals, or percent; and statistical analysis of rational data.