graphics with verbal descriptions in ways that promote the integration of concepts, (2) structuring practice by interleaving worked samples with new problems to solve, (3) carefully spacing the learning of critical content and skills over time, and (4) using focused feedback on quizzes and homework to promote student learning. We will describe how the principles have been specified and applied to the redesign of the CMP curriculum, and we will report findings from ongoing research studies that inform both cognitive theories and mathematics instruction.

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3. Measuring efficacy of principle-based redesign of science curricula
Presenter: Laura Desimone, University of Pennsylvania

We describe the results of two parallel large-scale randomized control trials designed to test the effects of applying cognitive science principles to particular units in two middle school science curricula: FOSS and Holt. There are three arms per trial, each with approximately 30 schools per arm: 1) the control group, who experience unmodified curricula and no supplemental professional development, 2) the content group, who receive professional development on the content related to the middle school science units, and 3) the cognitive science group, who receive a modified curriculum incorporating cognitive science principles and professional development in content knowledge and cognitive science. We measure student achievement results with two measures: the state standardized achievement test, and a test constructed by the research team to be aligned with the subject-matter content taught in the middle school science units being studied.

To date, there are 91 schools in the FOSS trial (28 in Pittsburgh and 63 in Arizona districts) encompassing 255 teachers, and 92 schools in the Holt trial (in Philadelphia), involving 201 teachers. The number of students participating in each trial is on the order of 7000, though only a subset of these will receive instruction in all three units of the intervention given variation in participating teachers and student mobility. We report interim results on student achievement, teacher content knowledge (as measured by a test the research team constructed), and teachers’ instruction (as measured by a self-report survey administered to teachers after they taught each unit that was part of the study).

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