

For preschoolers, math means more than counting to 10

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Students measure a sign.

Effectively teaching mathematics in preschool is becoming increasingly important.

According to Mable Kinzie, a professor of education at the University of Virginia's Curry School of Education, mathematics knowledge and skills as children enter elementary school have been found to be the strongest

predictor of later academic success – even more than early literacy skills.

A research team at the Curry School's Center for Advanced Study of Teaching and Learning has been developing and testing a professional development program for pre-kindergarten teachers focused primarily on math and science.

Researchers found that when teachers were provided with the "MyTeachingPartner-Math/Science" curricula and teacher support system (including three- to five-minute online video demonstrations of high-quality implementation of every learning activity, delivered by actual pre-kindergarten teachers in real classrooms), their students outperformed their peers in classrooms where the district's existing curricular activities were employed in assessments of geometry and measurement and number sense and place value.

The study, the results of which were published last fall in *Early Childhood Research Quarterly*, was conducted in 42 pre-kindergarten classrooms in a single Virginia school district, where researchers followed 444 children across a school year. All classrooms were part of the Virginia Preschool Initiative.

MTP-M/S is a complete curricular system, designed to support teachers in effective implementations of math and science lessons, in order to best improve their students' learning in these areas.

"In addition to early mathematics knowledge, early science competencies are also important," Kinzie said. "For example, children's early thinking and reasoning skills have been found to be strong predictors of children's later science, math and reading skills."

The MTP-M/S activities are designed to be engaging, fun explorations. For example, in the area of geometry, one activity engages preschoolers

in identifying the geometric shapes hidden in a mystery bag, using only their sense of touch and knowledge of the characteristics of circles, squares, rectangles and triangles. A measurement activity guides them in making predictions about volume – which container holds more, the tall and skinny one or the shorter, wider one? Additional activities focus on developing children's [number sense](#) and operations skills, along with their knowledge and skills in life, earth and physical science.

"It is both the actual curricula and brief, targeted teaching supports that are easy for teachers to use. The combination of the two elements is significant to these learning gains," Kinzie said.

Each activity is limited to two pages, maximum, and is clearly mapped out to include the objectives for the lesson and how to engage 4- to 5-year-olds in the activity, adapt the activity to the abilities of the children in their classroom, guide children in asking and answering questions using their mathematics and science knowledge and skills, and apply this knowledge and these skills throughout the day.

The curricula also follows the expected developmental trajectories for [children](#) of this age. For example, in a number activity at the beginning of the year, the math curriculum assumes a child entering pre-kindergarten can count to three. But by year's end, the curriculum has helped them develop counting skills up to 39, including understandings of place value.

The lesson plans are complemented with the online library of demonstration videos. Similar to keeping the lesson plans to a maximum of two pages, the MTP-M/S team knew that the videos must be limited in length.

"It was our goal that a teacher could be ready to lead an activity the next day in only 10 minutes preparation time," Kinzie said, "and it worked."

The team is currently working with 140 classrooms in schools in Kansas City, Missouri and Henrico County. The study will continue to follow teacher participants for two years.

Provided by University of Virginia

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