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Area conceptions sprout on Earth day.

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Summary: With the adoption of the Common Core State Standards for Mathematics (CCSSM), many concepts related to area are covered in third grade: (1) Recognizing area as an attribute of a plane figure; (2) Understanding that a square with a side length of one is a unit square; (3) Measuring area by tiling figures and counting the squares it takes to cover without gaps or overlaps; and (4) Relating area to the operations of multiplication and addition. Area concepts take time and experience to work through and understand. Researchers have shown that when students first encounter area, they often find difficulty structuring square units in rows and columns. Students will overlap area units or will leave gaps between them as well as create nonuniform units. In response to these concerns, *K. Miller* [in: *Origins of cognitive skills. The eighteenth annual Carnegie symposium on cognition. Hillsdale, NJ: Erlbaum. 193–228 (1984; ME 1987e.03737)*] and *Y. Wolf* [*J. Exp. Child Psychol.* 59, No. 1, 49–75 (1995; ME 1996a.00328)] have documented that when students are allowed to use physical square units or tools, they are more likely to develop strategies consistent with multiplicative rules and also develop mental imagery. To build spatial awareness, students need to solve problems through mathematical modeling, allowing interaction with and sense making of their world. This article describes a measurement lesson created by the authors to conceptualize the idea of area beyond the formula. The lesson centered on gardening and plant growth. Students investigated area and perimeter by constructing rectangular gardens using the same perimeter of fencing to see if and how this affected the area. Estimating, drawing, building, and checking were incorporated to help students develop and refine their conceptions of area. The lesson took approximately three days of instruction, one day for part 1 of the lesson and two days for part 2. (ERIC)

Classification: G30 M90

Keywords: area; concept formation; real-life problems; measuring; gardening

<http://www.nctm.org/Publications/teaching-children-mathematics/2015/Vol21/Issue8/Area-Conceptions-Sprout-on-Earth-Day/>