

**ZMATH 2011c.00770**

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**There once was a 9-block ... – A middle-school design for probability and statistics.**

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Summary: ProbLab is a probability-and-statistics unit developed at the Center for Connected Learning and Computer-Based Modeling, Northwestern University. Students analyze the combinatorial space of the 9-block, a 3-by-3 grid of squares, in which each square can be either green or blue. All 512 possible 9-blocks are constructed and assembled in a "bar chart" poster according to the number of green squares in each, resulting in a narrow and very tall display. This combinations tower is the same shape as the normal distribution received when 9-blocks are generated randomly in computer-based simulated probability experiments. The resemblance between the display and the distribution is key to student insight into relations between theoretical and empirical probability and between determinism and randomness. The 9-block also functions as a sampling format in a computer-based statistics activity, where students sample from a "population" of squares and then input and pool their guesses as to the greenness of the population. We report on an implementation of the design in two Grade 6 classrooms, focusing on student inventions and learning as well as emergent classroom socio-mathematical behaviors in the combinations-tower activity. We propose an application of the 9-block framework that affords insight into the Central Limit Theorem in science. (Contains 14 figures.) (ERIC)

*Classification:* K63 U53 D43

*Keywords:* college school cooperation; grade 6; scientific concepts; middle school students; statistics; mathematical concepts; probability; units of study; learning activities; computer simulation; computer assisted instruction