



American Statistical Association

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Dear Drs. McCallum, Daro, and Zimba,

On behalf of the American Statistical Association (ASA), I am conveying my appreciation for the opportunity to review the public draft of *The Common Core K–12 Mathematics Standards*. ASA put together a review group consisting of members who are prominent statisticians, statistics educators, authors of the *Guidelines for Assessment and Instruction in Statistics Education (GAISE) Report: A Pre-K–12 Curriculum Framework*, and members of the ASA/NCTM Joint Committee on Curriculum in Statistics and Probability. The group included Martha Aliaga, Christine Franklin, Patrick Hopfensperger, Tim Jacobbe, Gary Kader, Cliff Konold, Henry Kranendonk, Katherine Halvorsen, Jerry Moreno, Rebecca Nichols, Chris Olsen, Daren Starnes, and Mary Sullivan. The group synthesized their recommendations and provided them in the online survey. Below are some additional suggestions and comments.

There seems to be a disconnect between the *College and Career Readiness Standards* previously released and the draft of *The Common Core K–12 Mathematics Standards* with respect to statistics and probability. Our overall reaction and review of the previously released *College and Career Readiness Standards for Mathematics* was generally positive. The statistics, probability, and modeling components in the college and career readiness document emphasize the importance of data; variation in data; and the role of randomness in data collection, analysis, and interpretation. Instead of the K–12 standards document clarifying and providing a pathway to the statistics standards in the college and career readiness document, much of the statistics content that should be in elementary and middle school has been pushed to high school.

For the statistics content to provide substance and connection within a grade and growth across grades, more information is needed for teachers who do not have a statistics background to progress from the earlier grades to high school. It is important to begin the statistical problem solving process of formulating questions and collecting, analyzing, and interpreting data—described in the GAISE pre-K–12 report (www.amstat.org/education/gaise)—in elementary and then progress to high school and beyond. GAISE served as a model for Georgia, Colorado, Ohio, and Wisconsin in revising their data analysis standards in the mathematics curriculum from primary to high school.

We are still concerned with the limited role data analysis, probability, and statistics appear to play in the K–5 strands. High-achieving countries such as Hong Kong, Singapore, England, and Finland include a data category in the earlier grades. The *Trends in International Mathematics and Science Study (TIMMS) 2011 Mathematics Framework* devotes 15% of the fourth-grade assessment to data display and 20% of the eighth-grade assessment to data and chance. If the Common Core Standards are to be internationally benchmarked, a data analysis and probability should extend into grades K–5, with the TIMMS percentages as targets.

The *Mathematics Framework for the 2009 National Assessment of Educational Progress (NAEP)*, which is consistent with TIMMS, explains, “By grade 4, students should be expected to apply their understanding of number and quantity to pose questions that can be answered by collecting appropriate data. They should be expected to organize data in a table or plot and summarize the essential features of center, spread, and shape both verbally and with simple summary statistics. Simple comparisons can be made between two related data sets, but more formal inference based on randomness should come later.” The grade 4 and 8 NAEP exams include probability, which is not introduced in the Common Core standards until high school. In the current K-12 draft standards, students will not yet have the necessary skills needed to perform well on these exams. Adding relevant statistics and probability content in the K–8 grades would emphasize the pivotal role of statistics in a 21st-century education and prepare students for the data analysis, statistics, and probability content on the grade 4 and 8 TIMMS and NAEP exams.

We appreciate the opportunity to review the standards. If the ASA can provide additional information or assistance, please contact Rebecca Nichols, ASA K–16 education manager, at rebecca@amstat.org or (703) 302-1877.

Sincerely,

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President, American Statistical Association