

Superintendent's Recommendation: The Superintendent of Public Instruction recommends that the Board of Education accept the report.

Impact on Resources: These studies were conducted independently and free of charge by the College Board and ACT. No immediate action is required.

Timetable for Further Review/Action: No further action is required at this time. The results will be considered during the review of the Mathematics and English Standards of Learning in 2009 and 2010, respectively.

Summary of Studies Assessing the Alignment of Virginia’s Mathematics and English Standards of Learning for Postsecondary Readiness

The Department of Education requested the College Board and ACT to conduct studies comparing their respective standards for postsecondary readiness to the Virginia Standards of Learning (SOL) in English and Mathematics. The College Board conducted an analysis of the alignment between the College Board’s Standards for College Success and Virginia’s Standards of Learning in mathematics and English grades 6 through 12. They also provided a comprehensive synthesis of findings and recommendations to strengthen Virginia’s standards. ACT conducted a study to determine the alignment between Virginia’s SOL grades 8-12 and ACT’s College Readiness Standards. The results provide information on the one-to-one alignment between Virginia’s SOL and ACT College Readiness standards.

Mathematics

Both the ACT and the College Board analyses showed strong alignment between the Virginia Standards of Learning and their respective standards for postsecondary readiness. According to the College Board’s analysis, the cognitive complexity¹ required for students to meet the performance expectations is generally consistent across the Virginia Standards of Learning and the College Board Standards for Success. The only courses in which aligned standards differed in cognitive complexity were Geometry and Probability and Statistics. In both courses, the difference in cognitive complexity was small but potentially meaningful, and the College Board provided specific recommendations for Virginia to consider when it revises the mathematics standards. ACT also noted that “for those College Readiness Standards not covered in the Virginia Standards of Learning, it is generally the case that the skill is listed within the Virginia Standards of Learning but not explicitly at the rigorous level of the College Readiness Standards.”²

As can be expected when different groups develop learning expectations, the alignment studies also revealed differences between Virginia’s SOL and the standards developed by the College Board and ACT. One notable difference between the College Board and Virginia’s standards was the treatment of learning expectations for data analysis, probability, and statistics. The College Board Standards for Success integrate learning expectations for data analysis, probability, and statistics throughout its prescribed coursework in the middle grades and four high school courses: Algebra I, Geometry, Algebra II, and Precalculus. In Virginia’s SOL, these concepts are covered in middle school mathematics but not in the breadth of coverage that the College Board recommends. In high school, Virginia’s standards cover the concepts of data analysis, probability, and statistics primarily in the two courses: Probability and Statistics, and Mathematical Analysis. The College Board’s alignment experts suggested that Virginia consider strengthening these concepts throughout the standards to ensure a clear developmental progression through middle school and throughout high school courses to “articulate a clear developmental learning progression that will prepare students for the quantitative and statistical literacies that are increasingly expected in college and the 21st-century workplace” (College Board, pp. 4).³ The College Board also suggested that embedding these learning objectives in coursework

¹ The College Board used Norman Webb’s Depth of Knowledge classification to compare the cognitive complexity of Virginia SOLs and the College Board Standards for College Success. The four levels of classification are: 1) Recall, 2) Skill/concept, 3) Strategic thinking; and 4) Extended thinking.

² Sherri Miller, Assistant Vice President for EPAS Test Development, ACT. Personal communication, July 23, 2007.

³ College Board. (2007). Report on the Rigor and Alignment to College Readiness of the Virginia Standards of Learning:

throughout students' mathematics education would improve the alignment between instructional time focused on data analysis and probability with the National Assessment of Educational Progress (NAEP) Mathematics framework. As well, they recommend strengthening the cognitive complexity of these standards. The ACT alignment revealed several standards in their categories of Interpretation of Data, Scientific Investigation, and Evaluation of Models, Inferences, and Experimental results that were not aligned to Virginia's SOL. Several of these ACT standards have features in common with the College Board's standards that were recommended as models for Virginia to use to help strengthen the complexity of Virginia's standards in probability and statistics.

The College Board analysis also revealed differences between the courses recommended by the College Board in preparation for College, and the course offerings in Virginia's high schools. In particular, Virginia's Standards of Learning for Algebra II, Trigonometry, and Mathematical Analysis are similar in content to the College Board's Standards for Success in Algebra II and Precalculus. According to the College Board's alignment work, Virginia's Algebra II course has more rigorous standards than those included in the College Board's Algebra II Standards for College Success. However, the College Board research staff was unable to conduct a one-to-one course-level alignment between Virginia's standards and the College Board standards for Virginia's Trigonometry and Mathematical Analysis courses. Nonetheless, when Virginia's three courses were compared to the two-course sequence recommended by the College Board, the vast majority of the College Board Standards for College Success are covered in Virginia's SOL.

Despite the overall alignment of standards when all courses were considered, this difference in course options led the College Board to suggest that Virginia consider reorganizing the core material in Algebra II, Trigonometry, and Mathematical Analysis into a two-course sequence of Algebra II and Precalculus. This change would align Virginia's SOL with the College Board Standards for College Success. The College Board argues that this change would better prepare more students for college-level material. It should be noted that Virginia's two-course sequence of Algebra II/Trigonometry and Mathematical Analysis is intended to serve this purpose. The Algebra II/Trigonometry Standards of Learning combine all of the standards for Algebra II and Trigonometry into one course. In reviewing the mathematic standards, it will be important for Virginia to consider the typical courses that students take in relation to the specific findings provided by the College Board to ensure that all students are exposed to instruction associated with rigorous standards.

The College Board recommendations also identified specific standards in the SOL and supporting information in the Curriculum Frameworks that can be strengthened to better prepare more students for college-level material. As well, the ACT alignment revealed differences between the SOL and ACT's College Readiness Standards. These analyses will provide valuable information that will support the State's ability to enhance the standards for postsecondary readiness in the next review.

English

The overall alignment between the College Board Standards for College Success and Virginia's English Standards of Learning was considered strong. The College Board concluded that "in the sub-disciplines of reading, writing, and research, almost every language arts performance expectation included within the College Board Standards has been addressed at some level from grades 6-12" (pp. 5).⁴ The College Board concluded that the cognitive complexity of Virginia's standards was relatively stable across grades, whereas the complexity consistently increases in the College Board's Standards for College

Success. ACT concluded that Virginia’s English SOL “cover almost all of the skills within the College Readiness Standards but do not explicitly cover the application of many of those skills to increasingly more challenging and complex text.”⁵

The Standards of Learning cover, at some level, nearly all of the College Board’s Standards for College Success. Nonetheless, the College Board concluded that Virginia’s English SOL do not provide a “progressive development of knowledge and skills as students take on increasingly sophisticated texts and tasks” (pp.9),⁶ and offered several suggestions to improve the English SOL. These recommendations were intended to support Virginia’s ability to establish a more explicit and consistent developmental progression within the standards and associated Curriculum Frameworks across grades. The College Board suggests that improving the vertical alignment between grades provides an explicit framework that supports increasing the cognitive complexity of learning objectives and performance expectations as students advance through the grade level standards.

The College Board also recommended that Virginia consider expanding the emphasis on communications in the Standards of Learning. The analysis shows that Virginia’s SOL cover “most of the important features of communication” (pp. 36)⁷ somewhere in the standards, but suggested that the English SOL need further development of learning expectations in communications skills. Similarly, ACT’s analysis suggested that the oral language component of Virginia’s standards could be strengthened by incorporating interviewing skills to gain information, and to increase the standards for oral presentations. ACT’s standard related to interviewing skills has several objectives in common with the receptive communication standards in the College Board’s Standards for College Success, which the College Board analysis suggested could be strengthened. As well, both the College Board and ACT analyses suggest that Virginia’s performance expectations in media literacy and credibility of sources are less rigorous than is College Board or ACT standards.

Overall, the College Board’s and ACT’s analysis provided Virginia with valuable information that will support the state’s ability to enhance the Mathematics and English standards for postsecondary readiness when they are reviewed in 2009 and 2010, respectively.

⁵ Sherri Miller, Assistant Vice President for EPAS Test Development, ACT. Personal communication, July 23, 2007.

⁶ College Board. (2007). Report on the Rigor and Alignment to College Readiness of the Virginia English Language Arts Standards of Learning. New York: The College Entrance Examination Board.

⁷ *ibid*