

## **Virginia Mathematics & Science Coalition**

### **Position on Science Standards of Learning, Assessment and Accountability**

Superintendents, school boards and various state legislators have recently announced recommendations to modify Virginia's *Standards of Learning* system. Based upon the Coalition's review of research of best practices for K-12 science education, the Coalition offers and supports the following strategies for assuring that all K-12 Virginia students will be engaged in science curricula that prepare them for careers, post-secondary education and life.

1. Establish an advisory committee to study and offer recommendations to the Board of Education for the science standards, assessments and accountability system. At a minimum, the advisory committee should consider the following:
  - a) Revising Virginia's *Standards for Learning for Science* to increase the emphasis on inquiry-based practices and core disciplinary and cross-cutting concepts, as advocated in research-based studies (1,8, 9, 10, 13, 15);
  - b) Designing high-quality assessment options that are congruent with the revised standards and that address the wide range of higher-order scientific practices and conceptual understandings necessary for college and career readiness (2, 6, 7);
  - c) Developing an accountability system that reflects a range of reliable and feasible science assessment options that can be implemented at the school, division and/or state level, not just state-developed multiple-choice tests (2, 6, 7); and,
  - d) Funding for stakeholder training to implement the system effectively and to utilize derived data to improve teaching, learning and post-secondary preparedness (2, 6, 7, 10).
2. Continue the *Standards of Learning* science tests, at both grades 3 and 5, to ensure that science is taught; national data show that states have reduced the time spent on elementary science to focus on NCLB reading and math requirements, with the greatest reduction in science time occurring when accountability-level testing is eliminated for science (2, 3, 4, 7).
3. Forego additional exemptions from third grade science SOL assessment until the impacts of those granted in the 2013 legislative session on grades 3-5 reading and science scores are understood. Effective science instruction incorporates mathematics, reading and oral-written communication and has been shown to increase achievement in all areas, especially for disadvantaged learners. Therefore, sound integration, even in the early grades, enhances learning and performance in all these core subjects (5, 11, 12, 13, 15).

The Virginia Mathematics & Science Coalition (VMSC) is a nonprofit 501(c) (3) organization dedicated to achieving excellence in mathematics and science education for Virginia's K-12 and higher education students. As part of its mission, the VMSC evaluates policies, regulations and practices that impact the quality of mathematics and science education, provides information and analyses, and comments, when necessary, on public policy issues and initiatives addressing preparation for STEM-oriented careers.

**Contact: Fred Hoffman, President, Virginia Mathematics & Science Coalition,**  
president@vamsc.org. **Web:** <http://vamsc.org>

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### References

1. Achieve Inc. (2013). *Next generation science standards*. Available at <http://www.nextgenscience.org/next-generation-science-standards>.
2. Conley, D.T. & Darling-Hammond, L. (2013). *Creating systems of assessment for deeper learning*. Stanford, CA: Stanford Center for Opportunity Policy in Education. Available at <http://www.epiconline.org>.
3. Hamilton, L.A. (2010-11) Testing what has been taught. *American Educator* (Winter): 48.
4. Kelly, K. & Zucker, S. (2005). Curriculum narrowing. Pearson Policy Report, pp. 5-6.
5. Krajcik, J. and Sutherland, L. (2010). Supporting students in developing literacy in science. *Science*: 328 (5977): 456-459.
6. National Research Council. (2014). *Developing assessments for the Next Generation Science Standards*. Committee on Developing Assessments of Science Proficiency in K-12. Washington, DC: The National Academies Press.
7. National Research Council. (2013). *Monitoring progress toward successful K-12 STEM education: A nation advancing?* Committee on the Evaluation Framework for Successful K-12 STEM Education. Washington, DC: The National Academies Press.
8. National Research Council. (2012). *A framework for K-12 science education: Practices, cross-cutting concepts, and core ideas*. Committee on a Conceptual Framework for New K-12 Science Education Standards. Washington, DC: The National Academies Press.
9. National Research Council (2011). *Successful K-12 STEM education: Identifying effective approaches in science, technology, engineering, and mathematics*. Committee on Highly Successful Science Programs for K-12 Science Education. Washington, DC: The National Academies Press.
10. National Science Teachers Association (2013). *NSTA Position Paper on NGSS*. Available at <http://www.nsta.org/about/positions/ngss.aspx>
11. Pearson, P.D., Moje, E. & Greenleaf, C. (2010). Literacy and science: Each in the service of the other. *Science* 328 (5977): 459-63. A presentation at The National Academies Literacy for Science Workshop, December 9-10.
12. Romance, N.R. & Vitale, M.R. (2013). *Science IDEAS: Integrating reading/language arts within science instruction across grades K-5*. A presentation at The National Academies Literacy for Science Workshop, December 9-10.
13. Spotsylvania County Public Schools (2014). *Mad about science*. A 2014 VMSC Programs that Work Award Winner.
14. Sterling, D. (2013). *VISTA Update*. A presentation at the Virginia Science Education Leadership Association. November 14. Norfolk (VA).
15. Sterling, D. (2013). How does leadership matter? Developing and teaching a definition of hands-on science, a prerequisite for effective inquiry teaching, *The Journal of Mathematics and Science: Collaborative Explorations*: 13 (spring): 79-92.

### Ad Hoc Committee on Virginia Science Standards of Learning, Assessment and Accountability

Fred Hoffman: Roanoke Valley Governor's School for Science & Technology (ret.); President, VMSC Board  
Julia Cothron: MathScience Innovation Center (ret.); Chairman of Strategic Planning Committee, VMSC Board  
Delores Dunn: Virginia Association of Science Teachers; VMSC Board  
Francis Eberle: National Science Teachers Association (ret.); VMSC Board  
Juanita Jo Matkins: College of William & Mary; Virginia Association of Science Teachers  
Laura Nelson: Portsmouth City Public Schools; Virginia Science Education Leadership Association  
Henry R. ("Speaker") Pollard V: Christian & Barton LLP; Secretary & Chairman of Policy Committee, VMSC Board  
Pam Pulver: Fauquier County Public Schools; Virginia Science Education Leadership Association  
Donna R. Sterling, George Mason University; Chairman of Science Committee, VMSC Board

**Contact: Fred Hoffman, President, Virginia Mathematics & Science Coalition,**  
[president@vamsc.org](mailto:president@vamsc.org). **Web:** <http://vamsc.org>

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Shirley Sypolt: Hampton City Public Schools; Virginia Association of Science Teachers

Myra Thayer: Fairfax County Public Schools; Virginia Science Education Leadership Association

Diane Tomlinson: Russell County Public Schools (ret.); VMSC Board

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president@vamsc.org. **Web:** <http://vamsc.org>