Achieving Excellence in Mathematics & Science Education

A Strategic Plan Developed by
The Virginia Mathematics & Science Coalition

Approved on November 8, 2013

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Strategic Planning Process

In May of 2012, the Virginia Mathematics & Science Coalition (VMSC) Board authorized a Strategic Planning Committee. From May 2012 to 2014, the Coalition engaged in a strategic planning process designed to look at the future and to develop a long-term plan to increase the probability that the organization would achieve its vision: *All Virginia students will have the mathematical and scientific knowledge and skills necessary for success in society and for pursuit of a STEM-oriented career*.

Recurring expectations for the strategic planning process were "updating, self-assessment, focus, creating a road map, achievable and measurable goals, common view of mathematics and science efforts, increased collaboration with affiliate organizations and renewed and reinvigorated organization." Over the two years, an all-volunteer team of twenty-nine VMSC Board and volunteer staff members contributed thousands of hours to develop the strategic plan which was approved by the Board on November 8, 2013 and that will be fully implemented at the annual organizational meeting in May 2014. Key steps in the strategic planning process are summarized below.

June – September, 2012	Established a general strategic planning committee, reviewed previously drafted vision and mission statements and secured Board approval of revised statements by Board.
September – December, 2012	Established a foundation for strategic planning by brainstorming expectations, asking all Board and volunteer staff to rank expectations and summarizing findings in a report.
January –February, 2013	Reviewed expectations with Board and staff, secured input on planning process and timeline and received authorization from Board to proceed.
March – May, 2013	Conducted a situational analysis through surveys of various stakeholder groups including member and non-member organizations and key individuals; summarized findings and reported to Board in May; received authorization to establish subcommittees to develop specific plan components.
June – November, 2013	Worked as subcommittees to develop goals, objectives and strategies in four areas: curriculum and assessment, instructional delivery, human capital and VMSC organizational structure; presented draft plan to Board on November 8 for approval; plan approved with minor revisions
December – February, 2014	*Develop specific recommendations for implementing changes in the VMSC organizational structure and by-laws and present to the Board for approval in Winter 2014.*
March – May, 2014	*Implement organizational changes effective with the May 2014 meeting and charge the new leadership with developing operational plans that include specific tactics and related financial needs, methods for evaluating success, methods for communicating with stakeholders and updating the strategic plan.*

Since its formation in 1988, the Virginia Mathematics & Science Coalition has been an all-volunteer organization. The volunteers who made this strategic plan possible are listed on the following page. Committed volunteers made the Coalition's prior achievements possible and this same sense of volunteerism will drive implementation of our strategic plan for *Achieving Excellence in Mathematics and Science*.

Strategic Planning Committees

Julia H. Cothron	MathScience Innovation Center (retired)	Chairman
J. Ellis Bell	University of Richmond	General Committee, Curriculum & Assessment (Co-Chair)
Ted Bennett	Southern Virginia Higher Education Center (retired)	General Committee, Survey of Advisory Committee Members
Nicholas Bohidar	Monacan High School	Survey of VEA
David C. Carothers	James Madison University	General Committee, Human Capital
Darlene Derricott	State Council of Higher Education for Virginia	Survey of SCHEV Grant Project Leaders
Francis Eberle	National Science Teachers Association (retired)	General Committee, Survey of National Leaders, Human Capital (Co-Chair)
Reuben W. Farley	Virginia Commonwealth University (retired)	Human Capital
Sharon S. Emmerson-Stonnell	Longwood University	General Committee, Survey of VCTM, Instructional Delivery
David B. Hagan	Science Museum of Virginia	Survey of VAST, Human Capital
Margret Hjalmarson	George Mason University	Instructional Delivery
William E. Haver	Virginia Commonwealth University	General Committee, Organizational Structure (Co-Chair)
Roger Hathaway	NASA Langley Research Center	General Committee
Fred Hoffman	Roanoke Valley Governor's School for Science & Technology (retired)	General Committee, Survey of National Leaders, Human Capital
Laura Jacobsen	Radford University	Instructional Delivery (Co-Chair)
Vickie L. Inge	University of Virginia (retired)	Curriculum & Assessment
Paula Leach	Longwood University, ITTIP	Survey of VSELA Leaders, Curriculum & Assessment (Co-Chair)
Daniel C. Lewis	Virginia Community College System	General Committee, Survey of Community Colleges, Curriculum & Assessment
Edward M. Murphy	University of Virginia	Curriculum & Assessment
Debbie Neely-Fisher	J. Sargeant Reynolds Community College	Survey of VAS and VJAS, Instructional Delivery
Fiona Nichols	Portsmouth Public Schools	Survey of VCMS
Henry R. Pollard IV	Christian & Barton	General Committee, Survey of Political Leaders, Organizational Structure (Co-Chair)
Eric. J. Pyle	James Madison University	General Committee, Survey of VMSC Board & Members, Human Capital (Co-Chair)
Eric Rhoades	Virginia Department of Education	General Committee, Survey of MSP Grant Project Leaders, Curriculum & Assessment
Donna R. Sterling	George Mason University	General Committee, Survey of VISTA Leaders, Instructional Delivery
Manorama Talaiver	Longwood University, ITTIP	Survey of MSP & SCHEV Grant Project Leaders, Survey of National Leaders, Instructional Delivery
Diane C. Tomlinson	Russell County Public Schools	General Committee, Instructional Delivery (Co-Chair)
Linda L. Vahalla	Old Dominion University	General Committee, Survey of VTEEA and National Leaders, Curriculum & Assessment
Barbara Young	Virginia Department of Education	General Committee, Instructional Delivery

Introduction

The Virginia Mathematics & Science Coalition (VMSC) is a private, nonprofit 501 (c) (3) organization dedicated to achieving excellence in mathematics and science education for Virginia's K-12 and higher education students. The Coalition developed this multiyear strategic plan to:

- Promote an educational system that provides all Virginia students with the mathematical and scientific knowledge and skills necessary for success in society and for pursuit of a STEM-oriented career;

- Support high-quality learning standards, assessment and accountability systems that are congruent with best practices for achieving the learning outcomes essential for success in society and the workforce;

- Articulate the need for improving mathematics and science education by making strong connections among mathematics, science, engineering, computer technology and reading/language arts;

- Evaluate policies, regulations and practices that impact the quality of mathematics and science education and publicize those that lead to excellence;

- Provide information and comment on public policy issues that underlie successful preparation for STEM-oriented careers;

- Establish strong collaborative interaction of statewide partners who will advocate for the sustained elevation of mathematics and science education through quality disciplinary and interdisciplinary programs that include relevant engineering, computer technology and reading/language arts applications; and,

- Invigorate the Coalition so that it grows, develops and continues to provide strong leadership.

The strategic plan, *Achieving Excellence in Mathematics and Science Education,* outlines goals, objectives and strategies in four key areas:

- Curriculum & Assessment
- Instructional Delivery
- Human Capital
- VMSC Organizational Structure.

The Virginia Mathematics & Science Coalition welcomes new partners as it seeks to provide all Virginia students with the mathematical and scientific knowledge and skills necessary for success in society and for pursuit of a STEM-oriented career.

Curriculum & Assessment

Goal 1: All K-16 Virginia students will be engaged in mathematics and science curricula that prepare them for careers, post-secondary education and life.

Objective 1.1: Research, summarize and disseminate best practices for curriculum development and implementation.

Strategy 1.11: Synthesize current thinking on mathematics and science learning outcomes/standards essential for success, including links with general 21st century skills, workforce skills, intra- and interpersonal skills and societal issues.

Strategy 1.12: Research and summarize best practices for developing integrated curricula that are based upon rigorous standards and successful learning outcomes in mathematics and science.

Strategy 1.13: Identify and describe support systems required to successfully implement major curriculum changes.

Strategy 1.14: Disseminate key research documents and findings through a resource section on the VMSC website, white papers, documents and media appropriate for various audiences, presentations and/or *The Journal of Mathematics and Science: Collaborative Explora*tions.

Strategy 1.15: Position the VMSC as a resource for information and links to research-based information on mathematics and science curricula for other educators, providers of professional learning opportunities and policy makers in Virginia.

Objective 1.2: Provide statewide leadership on issues related to the development and implementation of *Virginia's Standards of Learning for Mathematics, Science, Technology,* and related emerging areas.

Strategy 1.21: Evaluate current learning standards and develop position papers.

Strategy 1.22: Provide input during initial revision and/or development of standards.

Strategy 1.23: Make comments and recommendations for proposed standards throughout the statewide development process.

Strategy 1.24: Analyze adopted standards to determine support systems required for their statewide implementation by educators and report support needs to policy makers.

Strategy 1.25: Advocate for full-funding of support systems required for implementation of statewide standards.

Strategy 1.26: As appropriate, seek special funding to develop and implement model support systems for new statewide standards.

Goal 2: All K-16 Virginia students will be assessed using multiple and balanced assessment strategies.

Objective 2.1: Synthesize current thinking on formative and summative assessment of student achievement in mathematics and science including understanding of disciplinary and cross-cutting concepts, use of disciplinary practices and ability to problem-solve.

Objective 2.2: Relate assessment of student achievement in mathematics and science to assessment of college and career readiness, 21st century learning and international standards.

Objective 2.3: Based upon research findings, advocate for assessment practices that result in meaningful educational experiences.

Objective 2.4: Advocate for accountability systems that are multifaceted and are in accord with disciplinary best-practices, college and career readiness standards, 21st century learning and international standards.

Objective 2.5: Disseminate key research documents and findings and position the VMSC as a major resource (see Strategies 1.14 and 1.15 for details).

Goal 3: Provide statewide leadership for building strong partnerships between the K-12 and higher education mathematics and science communities.

Objective 3.1: Provide opportunities to discuss and coordinate curricula including changes needed to better prepare students to succeed in post-secondary education.

Objective 3.2: Review credits in mathematics**,** science and related content required for graduation and make recommendations.

Objective 3.3: Use research findings to develop model programs for improving the quality of undergraduate programs (see Goals 1 and 2).

Instructional Delivery

Goal 4: Advocate and support mathematics and science instruction that engages students in meaningful learning and which includes a focus on disciplinary practices and relevant integration with other subjects.

Objective 4.1: Utilize research to make recommendations for effective instruction at all levels, e.g. K-5, 6-8, 9-12 and higher education.

Strategy 4.11: Implement a component of the VMSC website that includes links to key international and national documents and research studies.

Strategy 4.12: Research and summarize best practices through white papers, documents and media appropriate for various audiences.

Strategy 4.13: Present at key statewide conferences and/or hold special events to communicate findings.

Strategy 4.14: Disseminate key research documents and findings and position the VMSC as a major resource (see Strategies 1.14 and 1.15 for details).

Objective 4.2: Utilize research, as described in Objective 4.1, to support and/or deliver model professional development programs to increase educators' competencies in targeted areas.

Strategy 4.21: Effectively implement inquiry-based programs.

Strategy 4.22: Effectively integrate mathematics, science and other disciplines.

Strategy 4.23: Effectively utilize current and emerging digital technologies.

Strategy 4.24: Effectively incorporate computational thinking (modeling and simulations) and computing into instruction.

Strategy 4.25: Effectively blend on-line and face-to-face experiences.

Objective 4.3: Through research, identify, describe and promote support systems essential for implementation of effective mathematics and science instruction.

Strategy 4.31: Advocate for appropriate pupil-teacher ratios and time for instruction.

Strategy 4.32: Promote access to a physical classroom that supports inquiry and contains the requisite consumable materials, equipment and safety components.

Strategy 4.33: Make available access to high-quality curricula that include both instructional and assessment materials.

Strategy 4:34: Promote access to current and emerging digital technologies that are supported by an adequate infrastructure, resources and staff.

Strategy 4:35: Encourage parental and community understanding of effective programs and the critical role they play in implementation.

Goal 5: Develop and implement programs that increase school and division leaders' understanding of effective mathematics and science instruction and implementation strategies.

Objective 5.1: Partner with other statewide organizations to deliver programs for administrators.

Strategy 5.11: Continue mathematics-focused programming for K-5 and 6-8 administrators and consider establishing similar programs for science.

Strategy 5.12: Consider implementing programs for 9-12 administrators focused on mathematics and science.

Strategy 5.13: Consider extending effective mathematics- and science-focused programs to undergraduate instruction.

Objective 5.2: Support and utilize statewide programming models developed by the Virginia Initiative for Science Teaching and Achievement (VISTA) for educational leaders.

Strategy 5.21: Support the VISTA professional development model for division science supervisors and consider establishing a similar program focused on mathematics.

Strategy 5.22: Support the VISTA professional development model for higher education science and science education faculty and consider establishing a similar program focused on mathematics.

Objective 5.3: Recognize and document successful implementation of mathematics, science and integrated programs through *Programs that Work*.

Strategy 5.31: Recognize effective student programs.

Strategy 5.32: Recognize effective professional development programs.

Strategy 5.33: Create a model to promote emulation throughout Virginia of the *Programs That Work* awardees' projects.

Human Capital

Goal 6: Virginia will recruit, prepare and support high quality mathematics and science teachers throughout their career span.

Objective 6.1: Promote mathematics and science teaching as a highly desirable profession to enter and persevere within.

Strategy 6.11: Describe and support early engagement opportunities in the profession for mathematics and science teachers.

Strategy 6.12: Promote financial incentives to attract and retain mathematics and science teachers.

Strategy 6.13: Identify and promote models that support greater persistence in the professional growth of mathematics and science teachers.

Objective 6.2: Promote teacher preparation programs that include clinical, academic and interactive experiences.

Strategy 6.21: Summarize grade-band research on exemplary teaching and use this research to recommend and support teacher pre-service and in-service programs.

Strategy 6.22: Recommend incorporation of national standards and consensus documents for teacher preparation into Virginia's licensure requirements.

Strategy 6.23: Recommend incorporation of essential pedagogical content knowledge into teacher preparation courses, e.g. *Virginia's Standards of Learning, Common Core Standards for Mathematics, Next Generation Science Standards* and research-proven instructional strategies.

Objective 6.3: Promote and provide continual learning opportunities across the career span for mathematics and science teachers.

Strategy 6.31: Define the parameters of effective learning and leadership in the profession for mathematics and science teachers.

Strategy 6.32: Describe and support varying types of recognition across the career for mathematics and science teachers.

Strategy 6.33: Influence the design and implementation of performance assessments of mathematics and science teachers.

Strategy 6.34: Identify and support a range of incentives to increase retention of mathematics and science teachers.

Strategy 6.35*:* Provide descriptions and sources for research-based strategies for mathematics and science teaching (see Objectives 1.1, 2.5. 4.1, 5.1).

Goal 7: Build statewide capacity to license, educate and employ subject-area instructional specialists and leaders to support effective instruction in mathematics, science and related disciplines.

Objective 7.1: Evaluate the impact of existing professional development and degree programs and use this information to leverage future programs for mathematics and science teachers, specialists and administrators.

Strategy 7.1l: Support and disseminate studies that investigate the statewide impact of professional development and degree programs on measures of teacher competency and student achievement.

Strategy 7.12: Continue review of licensure requirements for mathematics specialists.

Strategy 7.13: Sponsor the expansion of certification programs, with a strong record of success, for specialists in mathematics.

Strategy 7.14: Identify existing high-quality professional development and degree programs in mathematics and science.

Strategy 7.15: Publicize through the VMSC web site, Policy Brief, and/or Brochure successful programs of effective high quality professional development in mathematics and science in Virginia.

Strategy 7.16: Reevaluate VMSC specifications for science specialists, given changes in state and national curricular standards.

Strategy 7.17: Based on the (7.16) re-evaluation, determine the need for specialists at the K-5, 6-8 or 9-12 levels and work collaboratively to pilot projects, with the long-range goal of establishing statewide licensure and degrees.

Objective 7.2: VMSC will explore the educational issues of computer science and engineering and their integration into STEM.

Strategy 7.21: Investigate pathways for the integration of computer science and engineering concepts into current mathematics and science classes.

Strategy 7.22: Investigate current licensure requirements for a full and add-on computer science certification.

Strategy 7.23: Identify and clarify the issues regarding licensure requirements for engineering certification.

Strategy 7.24: Explore the potential of a STEM add-on certification to emphasize the integral nature of the topics.

VMSC Organizational Structure

Goal 8: To invigorate the Coalition so that it grows, develops and continues to provide strong leadership.

Objective 8.1: Delineate and revise as needed the role of the Board and the process for becoming a member.

Objective 8.2: Delineate and revise as needed the role of the Volunteer Staff and the process for becoming a member.

Objective 8.3: Delineate and revise as needed the role of the Advisory Council and the process for becoming a member.

Goal 9: Make changes in organizational documents as needed to support the organization's mission and to promote implementation of the Strategic Plan.

Objective 9.1: Address the role of Volunteer Staff.

Objective 9.2: Consider creating the position of Volunteer Staff Coordinator (or Co-coordinators) to oversee and manage staff activities.

Objective 9.3: Specify the role of Chairpersons of Committees and Task Forces.

Objective 9.4: Specify the role of the Advisory Council.

Objective 9.5: Consider establishment of an Executive Director position.

Objective 9.6: Review by-laws for consistency with Strategic Plan implementation and propose any necessary changes.