

Draft
Virginia Mathematics and Science Coalition
Science Specialist Task Force Report Abstract
September 2007

Recommended Responsibilities for School Based Science Specialists

Specifically, the licensure programs for science specialists should include coursework and other preparation that will enable science specialists to:

- Serve as a liaison to translate science standards and current research into classroom practice to facilitate implementation of the Virginia Standards of Learning.
- Lead, organize, and facilitate professional development sessions to focus on the needs of staff members in the implementation of a high quality and challenging science program for all students.
- Work collaboratively and supportively with central office and building administrators and staff to plan, implement, support, and evaluate effective science programs that provide for the improvement of teaching and learning.
- Work collaboratively with teachers to implement a variety of instructional and assessment strategies that meet the needs of the school's student population.

Recommended Competencies for Science Specialists

A science specialist needs to possess a variety of skills that utilize (1) science subject content knowledge, (2) pedagogical content knowledge, and (3) educational leadership proficiency. Science specialists should have a strong vision of integrating these three competency areas to enhance science curriculum, teaching, and learning using research and experience. The following describe the competencies for this position.

- Committed to all children learning science.
- Possess a deep understanding of the science disciplines and science education standard strands, including: science as inquiry, biology, chemistry, physics, Earth and space science, science and technology, science in personal and social perspectives, and history and nature of science.
- Focus on the thorough development of basic science ideas and skills, including understanding the sequential/scaffolding nature of scientific principles embedded within the content strands.
- Possess a strong understanding of connections among science concepts and applications of these concepts to solve problems.
- Possess a strong understanding a current research in science content, science pedagogy, and education leadership.
- Possess an understanding of and the ability to effectively use cognitive processes in both academic and nonacademic settings, including: scientific reasoning, scientific communication, connecting scientific knowledge, and using scientific representations.
- Possess the ability to create quality, developmentally appropriate assessments that monitor student skills and understanding of science in order to guide instructional practice.
- Have an understanding of appropriate educational technologies and support their integration into science teaching and learning.
- Continue to enhance knowledge and skills in science content, pedagogy, leadership, and technology in order to translate these innovations into classroom practice.
- Possess a deep understanding of safety rules and regulations as well as how to design and maintain a safe classroom environment.

- Demonstrate the ability to collaborate with and support teachers through co-teaching, mentoring, modeling, and coaching.
- Demonstrate the ability to work collaboratively with teachers and maintain open communication with central office and school administrators, counselors, and educators outside of the classroom.
- Demonstrate the ability to assess and identify teacher professional development needs and develop appropriate measures to address those needs.
- Demonstrate the necessary leadership skills to administer staff development in science content, science pedagogy, and monitoring/assessment of student learning.

Recommended Licensure for Science Specialist

The Task Force reviewed the possible role and responsibilities that a specialist in Virginia's school might take on and the competencies necessary to carry out these responsibilities. Based on the review of research at the national level as well as information gathered from school divisions in Virginia, we recommend science specialist licenses for preK-6 and 6-12. We recommend that a candidate seeking an endorsement as a science specialist have:

- Completed at least three years of successful classroom teaching experience in which the teaching of science was an important responsibility,
- Graduated from an approved science specialists preparation program (master's level) or completed a master's level program in science, science education, or related education field with at least 30 semester hours of graduate course work in the competencies described above, and
- Strong science content background during their bachelor's or master's degrees that includes for preK-6 at least 21 semester hours of coursework in undergraduate or graduate-level science and for 6-12 at least 42 semester hours of coursework in undergraduate or graduate-level science.

Recommended Professional Coursework for Science Specialist

Teachers who want to become a science specialist select a preK-6 and/or 6-12 endorsement. Although coursework will vary among the grade levels, the programs will lead to a master's degree. To become a preK-6 elementary specialist, candidates will complete 15 graduate semester hours of science content, 9 graduate semester hours of science teaching and leadership, and 3 graduate semester hours of professional experience. To become a 6-12 secondary specialist, candidates will complete 12 graduate semester hours of science content, 12 graduate semester hours of science teaching and leadership, and 3 graduate semester hours of professional experience in addition to having a bachelor's degree, or the equivalent, in a science content area.

Conclusion

By establishing a science specialist endorsement Virginia will continue in its tradition of excellence in science education. The need for sustained, relevant professional development in science education at the elementary and secondary level has been extensively documented in research and practice. All learners will benefit from having access to a trained science specialist who can develop effective instruction, provide professional development, partner with the science and education communities, and translate research into practice. Endorsed science specialists will have a deep understanding of science content, pedagogical content knowledge and education leadership. They will use their knowledge and skills to improve instruction in their communities, demonstrating Virginia's commitment for all students to learn science.