



**The Wisconsin Society of Science Teachers was founded in 1958.  
Today it is the largest organization in Wisconsin of individuals  
interested in the advancement of science education.**

Tony Evers, State Superintendent  
Wisconsin Department of Public Instruction  
125 South Webster Street  
Madison, WI 53703

Dear Dr. Evers and Members of the Leadership Group on School Staffing Challenges,

The Wisconsin Society of Science Teachers (WSST) is a non-profit, membership organization dedicated to the advancement of science education in the State of Wisconsin. A state affiliate of the National Science Teachers Association, WSST's membership is comprised of 750 science educators and as well as many businesses with interests in science education in Wisconsin. This letter has been reviewed by the WSST Board of Directors.

WSST is concerned about implications for Wisconsin's K-12 students proposed in the recently released *Full Summary of Preliminary Licensing Recommendation prepared by the Leadership Group on Staffing Challenges* (dated 1/27/2017). We would like to point out issues that are of particular concern from the perspective of those who are teaching science in Wisconsin's schools and interacting with the parents and communities in which we teach.

### **Fewer licenses, more flexibility**

We agree that increased flexibility for teaching license areas and levels is needed. This is particularly true in rural schools where one or two science teachers teach courses across multiple disciplines and grade levels. However, the need for flexibility must be balanced with ensuring that Wisconsin's students have rich science learning opportunities at all grade levels. In a 2007 review conducted as part of the National Science Foundation's *Math Science Partnership Knowledge Management and Dissemination project*, researchers at Horizon, Inc.<sup>1</sup> concluded that science teachers with deeper content knowledge were more likely to actively engage students than teachers with weaker content knowledge. In addition, they stated that teachers with deeper content knowledge were better able to identify key concepts within the science curriculum. Research on teacher retention also predicts that reducing teacher knowledge of how to teach specific subjects to specific grade levels will increase teacher turnover.<sup>2</sup>

Although a single subject license in science provides increased flexibility, it also has the potential to erode student learning experiences by allowing teachers without a deep understanding of disciplinary content to teach upper level science courses. We know from decades of research that depth of teacher subject matter knowledge is one predictor of teacher effectiveness.<sup>3</sup> A decreased emphasis on teacher content knowledge may have negative consequences for students' future academic success. For example, a 2009 study by Schwartz, Sadler, Sonnert, and Tai found that students who studied key concepts in depth (defined as one month or more) in high school science courses earned higher grades in introductory college science courses when compared to students whose high school experiences focused on breadth of content coverage.<sup>4</sup>

We suggest the following in order to balance the need for flexibility with the need for depth of content knowledge:

1. Require that a teacher holds a science license and has a minimum of an “emphasis” in a discipline in order to teach high school science courses within that discipline. Guidelines for that emphasis should be developed consistent with the National Science Teachers Association’s position statement on Preparation of Science Teachers, which calls for robust knowledge and skills beyond the depth and breadth of the grade level. This would also be consistent with the current Wisconsin Broadfield Natural Science license requirement for discipline specific concentrations.
2. Provide a short-term (3 year, non-renewable) exception to the requirement for an emphasis in situations where a licensed science teacher needs to teach courses in an area where he or she does not hold an emphasis. These exceptions should be contingent on the development and implementation of a plan to earn the appropriate disciplinary emphasis.
3. A PK-9 licensed teacher teaching at the 9th grade level should hold the equivalent of a minor in the subject (e.g. a general science minor) area for the course. In Wisconsin, only 26% of 8th grade science teachers in high poverty schools have an undergraduate major in science as compared to 47% of the nation in like schools (US Department of Education, 2015). Extending a generalist license to the ninth grade level has the potential to negatively impact science learning experiences at the high school level - particularly in our most economically disadvantaged schools.
4. Expanding the science license to cover all grades, PK-12, may provide some opportunities for science specialists at the elementary level, we are concerned that the increased need for pedagogical preparation at earlier grade levels may come at the expense of scientific content knowledge. Guidelines for teacher preparation programs will need to carefully balance the development of both science and pedagogical understanding.

### **Effective collaboration to address shortage and other workforce needs**

As the largest professional organization for teachers of science in the state, WSST provides professional growth opportunities for our members and regularly connects our members to curricular resources, grants, and professional development, including peer-led professional opportunities (e.g. an annual book study in collaboration with DPI). We welcome the opportunity to deepen our collaboration with the education community to help address teacher workforce needs.

### **Ease licensing processes for educators trained in other states**

Requirements for teaching preparation are higher in Wisconsin than in many other states. Wisconsin teachers must meet requirements for science content knowledge and teaching performance to receive an initial educator license as highly qualified teachers. Ensuring that teachers prepared outside of Wisconsin meet the same standards required by state law would reassure parents that their student(s) is receiving instruction from a teacher who has met both the statutory requirements and teaching performance expectations for teaching children of Wisconsin.

### **Reduce testing burden on prospective teachers**

We concur with the recommendation that would allow a teacher candidate to demonstrate competency in a subject through means other than a content exam (e.g., the PRAXIS II) and the Foundations of Reading Test.

### **Expand opportunities for licensed teachers to take on new challenges**

Based on data for the 2016-17 year from the DPI, there are 1,976 teachers in Wisconsin schools on an emergency license or permit - roughly 4.7 teachers/district. Put another way, if these 1,976 teachers enrolled in one of the 33 IHE-based teacher preparation programs in Wisconsin the enrollment at each teacher preparation program would increase by 60 students. It might be more efficient to incentivise IHE-based institutions to provide alternative pathways to licensure rather than have each school district develop and offer them.

In conclusion, the Wisconsin Society of Science Teachers would welcome the opportunity to provide input for the Leadership Group on School Staffing Challenges. WSST can provide your group with perspectives on the content and pedagogical expertise needed by K-12 teachers of science and the full range of professional growth and development experiences that teachers need as they enter the profession and throughout their careers as professional educators. Please feel free to contact me with any questions regarding our involvement with the Leadership Group on Staffing Challenges.

Respectfully,



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President, Wisconsin Society of Science Teachers  
C/O WSST  
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Cambridge, WI 53523

Cc.: Michael Thompson, Shelia Briggs

<sup>1</sup> Heck, D., Smith, S., Taylor, M., & Dyer, E. (2007). Review of empirical research on teachers' mathematics and science content knowledge and its effects on teaching practice and student outcomes. Chapel Hill, NC: Horizon Research, Inc.

<sup>2</sup>Ingersoll, R., Merrill, L., May, H. (2012). How Preparation Matters. *Educational Leadership*, 69(8), 30-34.

<sup>3</sup>Darling-Hammond, L., & Youngs, P. (2002). Defining "highly qualified teachers": What does "scientifically-based research" actually tell us?. *Educational researcher*, 31(9), 13-25.

<sup>4</sup>Schwartz, M.S., Sadler, P.M., Sonnert, G., & Tai, R.H. (2009). Depth versus breadth: How Content Coverage in High School Science Courses Relates to Later Success in College Science Coursework. *Science Education*, 93(5), 798-826

