February 27, 2018

Review of the Maine Science and Technology Standards

Representatives of the Maine Department of Education,

My name is Alison Miller. I am a Brunswick resident, a parent of two young children who will attend public school in the next few years, and an Assistant Professor of Education at Bowdoin College. I have nine years of teaching experience at the middle and high school levels. I earned my doctorate in Science Education from Columbia University and my scholarship is in the Learning Sciences. I am here today on my own behalf and as a representative of the Education Department at Bowdoin College and I thank you for the opportunity to speak about the review of the Maine Science and Technology standards.

Specifically, I would like to urge the Committee to support the adoption of the Next Generation Science Standards (NGSS). These standards are informed by evidence-based research as outlined in the Framework for K-12 Science Education, a report authored by a committee which included educators, cognitive and learning scientists, and policy makers and published by the National Academy of Sciences. The NGSS are the result of careful collaboration between 26 Lead Partner States, including Maine. Because I am a science educator and a learning scientist, I want to focus on the advantages of these standards, as I see them, for students in Maine.

For years, science curricula have been mired in the conflict between breadth versus depth and have separated content from the process of scientific inquiry. Scientific advances happen constantly, and there is simply no way for teachers to address all science content in a comprehensive manner. The NGSS offer the promise of three-dimensional learning, balancing core disciplinary ideas with crosscutting concepts like stability and change, patterns, and cause and effect which can be seen across disciplines. The third dimension of the NGSS, (scientific and engineering practices) is, in my estimation, one of the most important departures from prior standards. The inclusion of scientific and engineering practices operationalizes the process of scientific inquiry and necessitates a hands-on approach to science learning. Students are encouraged to ask scientific questions, analyze and interpret data, develop and use models, and engage in argument from evidence. In other words, the NGSS provide a framework for students to learn science content by engaging in inquiry like scientists do.

At a time when Maine public schools are migrating to proficiency-based diplomas, the NGSS provide a coherent framework for assessing proficiency in science. I have spoken with teachers in several districts that
have already adopted the NGSS and they are utilizing the scientific and engineering practices as a means to assess student proficiency. As a teacher, when I ask students to develop models of a complex system, explain and critique those models, and then revise them so that they more accurately represent the system under study, I am encouraging my students to externalize their thinking in ways that allow me to assess both what they know and what they are able to do with that knowledge. In prior public forums, I have heard individuals argue that the NGSS are too complex for teachers to understand and work with. I have heard people argue that “simple” standards outlining content to be learned will provide a more straightforward path for teachers and students. I would like to caution that such arguments deprofessionalize science teaching and effectively lower the bar of expectations for both teachers and students. As a teacher, as a parent, and as a learning scientist, I believe in setting the bar high. Maine’s students deserve that.

The Department of Education at Bowdoin College, like other teacher preparation programs in Maine, has already integrated the NGSS in our methods courses. Our preservice teachers are developing curriculum units and aligning lessons with the Next Generation Science Standards because we feel this is an important part of preparing teachers for a national job market and for engaging students in more authentic science learning.

Finally, I would add that adopting the Next Generation Science Standards will allow educators and districts across Maine to share resources and teaching strategies with educators in other states. Nineteen states have already adopted the NGSS and universities and nonprofits have begun crafting curricular and professional development resources and making them available to educators. Several weeks ago, I was able to observe a group of teacher leaders from across our state engaging in one such professional development program aligned with the NGSS. Maine’s teachers and school districts can benefit from these shared resources rather than investing precious time and money into developing curricular and professional development materials aligned exclusively to the Maine’s standards. It is with all of this in mind that I encourage you to move forward by adopting the Next Generation Science Standards for Maine’s students.

Best,

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