Dear Ms. Templeton:

I am pleased to offer the following comments regarding the Maine Learning Results (MLRs) in science and technology.

The current MLRs are ineffective and need replacement for several reasons. First is their lack of highlighting or even mentioning engineering. In Maine and across the nation, there is a huge unmet demand for engineering and it is critical that Maine K-12 students have at least an inkling of this career track. Engineering comes in many varieties—electrical, civil, mechanical, and ocean are just a few, and all center on problem solving. But without direct connection via the MLRs in science and technology, engineering and the engineering process will rarely be mentioned, let alone taught.

A second problem with the current MLRs in science and technology is that the standards are split into two different chapters of law, one necessitating testing and one not. It is a well-known maxim in education that what you test is what is taught. While content is tested, scientific processes are not. It is highly likely that this is mirrored by instruction in science content and not in scientific processes in Maine classrooms.

Thirdly, the current MLRs were created by a group of well-intentioned Maine educators, but without much external validation or use of research.

Since that time, a major science education research effort, headed by the National Academy of Sciences, has created a foundational document, the Framework for K-12 Science Education. This study had 18 members, 9 who are members of the National Academy of Sciences or National Academy of Engineering including a Nobel laureate in physics and one in chemistry, and 9 who are cognitive scientists, educational policy researchers, and science educators. Science and engineering concepts identified by these people is beyond reproach.

Using the evidence and wisdom of practice of this document as a guide and with a massive effort involving at least 26 states, the Next Generation Science Standards (NGSS) were developed.

Maine was a lead state in development of the NGSS and had a team of over 20 educators who reviewed and provided input on numerous occasions as did hundreds of Maine science educators.
Most Maine districts, according to Maine Science Teacher Association data, have already adopted NGSS and we don’t want to go backwards. Districts have already invested in professional development and materials consistent with NGSS.

NGSS combine instruction into three dimensions of science and engineering practices, disciplinary core ideas and crosscutting concepts. The current MLRs, while having process and content, separate these into accountability standards and non-accountability standards.

NGSS focus on science and engineering - both vital for students in the 21st century. The MLRs mention engineering once.

Why would Maine not take advantage of work that began with the National Academy of Sciences, and involved most states and science educators? The NGSS are without a doubt based on the best research to date, and unique in that. Utilizing the Framework for K-12 Science Education and the NGSS as foundational documents for review of the current MLRs is a no brainer.

Please keep me informed on this critical step to bring Maine into the 21st century in science, the first step in STEM (science, technology, engineering and math). Maine needs its students to have a strong understanding of 21st century science and engineering for educational, economic and civic advancement.

Just a quick word about myself - I have a doctorate in science education from the University of Massachusetts and have been a school teacher, school administrator and state science specialist in Maine and worked in-state and nationally in science education for over thirty years. I am a Maine resident.

Thank you.

Tom

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Tom Keller
mobile 207-350-6106
email tom.keller.me@gmail.com