

# Science education in Sisters

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Science is simply a way of exploring our world. With careful and rigorous instruction, Sisters students can develop skills of discovery and ways of analyzing evidence that will last a lifetime. But for teachers to identify what students need to know and the best ways to help them learn is complicated and rapidly changing.

The challenge of science education became national news in 2012 when the Department of Homeland Security announced that foreign students graduating with a degree in any of 400 college programs could have their visas extended. These programs were in the fields of science, technology, engineering, and math. With this new policy, the catchy acronym for these 400 programs, 'STEM,' took on real force. But the problem it addressed was real. An international test of scientific competency of 15-year-olds revealed that the U.S. ranked near the bottom, 23rd of 30 countries. Simply put: there were insufficient well-trained American students to fill the workforce. Foreign students with STEM education could stay.

The importance of STEM education is easy to state:

Our knowledge-based economy is driven by constant innovation. The foundation of innovation lies in a dynamic, motivated and well-educated workforce equipped with STEM skills. The fruition of innovation requires vision and leadership. Currently, there are only four statesmen at the state and national level with

education in STEM.

So far, rolling out comprehensive STEM education has been difficult; indeed, there has been no agreement among educators on what constitutes acceptable curriculum for K-12 students to prepare them for a STEM field of study in college. Individual lesson plans are offered at national conferences, in books, and online. Some teachers and schools adopt them. Many hold back, seeing STEM as the latest trendy new thing in education. And problems have emerged. As yet, there is no equitable opportunity for all students. Biases have been exposed against minorities and women. Engineering has received little to no attention. The art community wants to add an "A" for STEAM. Language education advocates suggest STREAM by adding an "R" for reading.

Chaos, not clarity.

In 2015, the State of Oregon (House Bill 3072) took up the challenge and created six regional STEM hubs charged to define educational goals, identify critical

elements, and create linkages between educators and communities. The hubs have no resources or programs themselves, but are chartered to build partnerships between educators and business leaders and leverage their resources to increase STEM

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activities. It is too early to know if this “collective impact model” will work. The Central Oregon STEM Hub in Redmond ([www.centraloregonstem.org](http://www.centraloregonstem.org)) acts primarily as an information clearing house for STEM activities in schools. Additionally, high-tech businesses like Intel, Vernier and Garmin now offer prizes for students at science fairs in the communities

of their employees. Sisters doesn't qualify.

In July 2011, The National Research Council released the first draft of a new K-12 curriculum called Next Generation Science Standards (NGSS). Over the next two years, individual states including Oregon worked with national leadership to bring these to adoption, now achieved in 19 of the 40 states that have shown interest. Resistance still exists in some state legislatures who oppose teaching the facts of evolution and climate change.

The new NGSS standards are a major departure from the prior 20 years of teaching science, where the focus was on students memorizing “nerdy facts.” NGSS takes its origin from observations of innate human curiosity and wonder that emerge early in life — infants see something of interest and explore it with their senses. They later learn to ask questions — what is it? How does it work? Why does this happen? And still later — how do I know the answer is

correct?

NGSS places its greatest emphasis on teaching scientific practices: asking questions, defining problems, carrying out investigations with others, interpreting data, designing solutions, arguing from evidence, evaluating and communicating information. Students learn science by doing science — not by memorizing facts that are now readily available on the Web. These processes are taught by examining core ideas in life sciences, physical sciences, earth and space science, engineering and technology.

The NGSS curriculum is cumulative K-12, each grade building on what has come before. The overarching goal is for every high school graduate to be literate in science. A subset of students who have interest in lifelong learning and possess aptitude to pursue STEM beyond high school will find a ready job market with twice the pay level of other careers.

Science education in the Sisters School District is

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