

2012

The EPSCoR Strategic Implementation Plan's "Actions"

Solar Panel



Kyle Litzel, Leo Cope, David Kraus, Chance Englebert, and Matt Peters. Standing in back is instructor Jeff Scheinost



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DEPARTMENT OF EDUCATION
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05/02/2012

Mark Wilson and company -- interview 2012

Note: The reference to “Goal 2 Action” refers to the EPSCoR Strategic Implementation Plan’s “Actions”.

1. Has graduate-level coursework for K-12 teachers that “deepens content knowledge” been developed and implemented? – especially coursework that connects in some way with “science and engineering efforts and researchers within the state?” If it has been implemented, how many K-12 teachers have participated in such coursework? OR What are the courses that have been developed -- and have K-12 teachers participated? Is there any measure that you have found that would tell us whether such coursework has been effective in promoting interest in STEM subjects? [Goal 2 Action]

South Dakota was lucky to receive a line item, for Science Education, in this year’s budget of Governor Dennis Daugaard. This line item was titled South Dakota Investing in Teachers. The program has components to train for Common Core, Science, Counselor training and Administrator training. The Science training was named Science Academies, by the Governor, and has the function of building capacity for state science education.

Science Academies

Intent: “Create a shift in instructional practice to challenge students to higher levels of understanding.” (This specific wording allows us to deliver a consistent message to districts, specifically administrators, regarding Common Core and Science PD.)

Target: Designed for middle and high school science teachers

Goal: Train approximately 420 middle school science teachers and 420 high school teachers

2013 Middle School Science Academies

420 middle school teachers will be trained regionally by “Lead Teachers.” All teachers will be trained in the dimensions of the *Framework for K-12 Science Education* with a specific focus on the scientific and engineering practices. Academies will each be held for three days in the summer of 2013 with one follow-up day for reflection, evaluation, or potential learning community collaboration.

Training of “Lead Teachers” and creation of academy content will take place during 2012-13. In spring of 2013, once “Lead Teachers” have had experience utilizing the *Framework*, the exact structure of the science academy will be developed. More information will be added to this website at that time. <http://doe.sd.gov/secretary/iitscience.asp>

2014 High School Science Academies

420 high school teachers will be trained regionally by “Lead Teachers.” All teachers will be trained in the dimensions of the *Framework for K-12 Science Education* with a specific focus on the

scientific and engineering practices. Academies will each be held for three days in the summer of 2014 with one follow-up day for reflection, evaluation, or potential learning community collaboration.

Training of “Lead Teachers” and creation of academy content will take place during 2013-14. In spring of 2014, once “Lead Teachers” have had experience utilizing the *Framework*, the exact structure of the science academy will be developed. More information will be added to this website at that time.

<http://doe.sd.gov/secretary/iitscience.asp>

Lead Teacher process...

For the initial round of academies to be a success, first an initial cadre of 12 MIDDLE SCHOOL TEACHERS (gr. 6-8) needs to be identified. These lead teachers will ultimately create the Science Academies from their personal experience utilizing the dimensions of the *Framework*. The purpose and timeline for these middle school “Lead Teachers” is as follows:

June 18-22, 2012: Initial training of 12 middle school “Lead Teachers” in incorporating the three dimensions of the *Framework for K-12 Science Education*. Training will include work with specific content, classroom environment topics and specific science instruction strategies. “Lead Teachers” will leave with working knowledge of the *Framework* that can and will be applied within the classroom. “Lead Teachers” will also leave with instructional strategies and material that fully embody the dimensions of the *Framework*.

During the 2012-2013 school year, the “Lead Teachers” will be expected to teach the material from the summer training. A film crew will obtain footage to document appropriate use of the three dimensions from the *Framework* and with a specific focus on the Scientific and Engineering Practices throughout the school year. Around 12 weeks into school, “Lead Teachers” will convene for a reflection session to watch raw video footage to analyze teaching practice. The reflection session will be recorded. The teachers will analyze footage and determine focus and adjustments for next semester of teaching and video capture. Teachers can expect to have their classroom recorded at least twice throughout the school year. Teachers will also be structured in grade level groups to act as PLC for support and discussion throughout the school year. After all footage is captured and edited to isolate specific practices, the professional development will be created in the late spring/early summer of 2013. “Lead Teachers” will be leading the creation of the professional development and will also act as trainers for, at minimum, three 2013 summer academies.

2. Has the State focus on project-based and engineering coursework for secondary students been strengthened and expanded to middle and elementary grade levels? If so, what steps have been taken? Any examples? [Goal 2 Action]

Year I:

Canton (Project Lead The Way Gateway Academy)

- This project implemented the PLTW middle school curriculum. The district integrated the engineering curriculum into the MS Science course.

Sioux Falls (MS LEGO)

EPSCoR grant allowed middle school student’s access to an extended three week robotics unit instead of access to a four day robotics module. The extended Robotics module engaged students in 21st Century Skills: analytical thinking, problem solving, creating and innovation, and collaboration and communication. The students are participating in an extended and updated robotics module that challenges students to build, operate and program robots to perform complex tasks and that demonstrates how robots impact lives, careers, and industry.

The Sioux Falls Middle Schools partner with The SD FIRST® LEGO® League program, Augustana College, and the Sioux Falls CTE Academy to share materials and to support student interest and participation in the study of how robotics are build, programmed, and impact live, industry, and careers.

East Dakota Educational Cooperative (Gateway Camps)

Gateway Camps: The Gateway Academy Camps utilize Project Lead the Way’s project-based, hands-on, and real world problem solving approach to STEM education. The camps are designed to nurture kids’ imaginations, inspire creativity, and develop self-confidence. The educational activities found at a Gateway Academy Camp thoroughly engage girls and boys from all backgrounds, igniting their passion and fueling interest in understanding how things work, while significantly advancing their skills in STEM subjects.

Gateway Academy sites are selected to provide leading edge technologies that allow kids to sample topics such as robotics, dissection, and 3D modeling. Participants will broaden their understanding of the engineering design process and the scientific method. They will act as scientists, researchers, and engineers while being exposed to these career paths.

Our Website: <http://doe.sd.gov/octe/gatewaycamps.asp>

This project funded three Gateway camps for middle school students from the following districts.

- Canton
- Sioux Falls
- Watertown

Year II:

East Dakota Educational Cooperative (Gateway Camps)

Gateway Camps	
Year	Students
2010	54
2011	109
Total	163

Females	
Year	Students
2010	15
2011	41
Total	56

Grade Level of Participants by Camp Location that Took Survey

Grade	Sioux Falls	Brookings	Platte Geddes	Sturgis	Rapid City	Total
6	21	7	0	9	1	38
7	9	8	3	6	5	31
8	4	1	2	1	9	17
Unknown	2	0	0	0	0	2
Total	36	16	5	16	15	88

	Sioux Falls	Brookings	Platte Geddes	Sturgis	Rapid City	Total	
I had fun at the camp	35	15	5	16	15	86	98%
I would attend a camp next year	33	14	5	16	15	83	94%
I learned from the Activities	35	14	4	16	15	84	95%
I liked the lunches	29	15	5	11	14	74	84%
I will take three or more math classes in HS	28	10	5	10	13	66	75%
I will take three or more science classes in HS	27	12	5	10	15	69	78%
I have used SDMyLife	9	0	4	2	9	24	27%

List of Careers you would like to enter

	Sioux Falls	Brookings	Platte Geddes	Sturgis	Rapid City	Total	
Aviation	12	3	1	2	3	21	24%
Computer Technology	16	9	1	3	5	34	39%
Engineering	19	10	4	5	11	49	56%
Medicine/ Health Care	12	3	1	6	6	28	32%
Other Math or Science Careers	14	8	3	3	7	35	40%

East Dakota Educational Cooperative (Aviation Project)

Aviation Professional Development Project: The contact information for each presenter is in a database, and each person has given permission for us to contact them again. Their presentations, lab-type activity instructions, and other resources are all available via the SD Stem Website. Many of our STEM teachers have already re-used much of this in their classrooms. Teachers will continue to use this information in future classes. The professors at SDSU have identified two classes that could be made available for dual credit. I will continue to investigate ways to make this an affordable option for high school students.

Aviation Cluster Camp: We have a framework in place for future aviation camps, including a list of potential speakers for future events. Funds from this year’s EPSCOR grant were used to purchase educational equipment that could be used at future Aviation / Stem-related camps. Upcoming camps would only have nominal, operational costs now.

Regional Resource Library: A variety of academic and STEM-career resources were purchased for the regional resource library, which is available to teachers state-wide. A list of these resources was given to current STEM teachers, and the final list will be stored on the SD Stem Website. The collection now includes several DVDs, books, manuals, and lab equipment. These resources will help to meet our on-going goals of increasing literacy and student engagement.

Career Guidance / Advisory Teams: Numerous new sites have been identified for usage as job shadowing and internship sites. I am keeping in touch with these people and organizations regularly, and they have given us leads on scholarship and funding opportunities for future projects. Some of them have also led class tours and have served as speakers, which they’ve agreed to continue to do as well. A major goal of this grant was to encourage connections between schools and businesses, so that partnerships could grow authentically. It appears that this is happening, as teachers are beginning to solidify plans for the growth and direction of their STEM programs.

Providing STEM Opportunities through Student Competition

As K-12 Educational Outreach has moved forward with activities within our projects, we have also encouraged participants within our projects to be actively engaged in student competitions in order to inspire our youth, but to gauge their success. One example would be with the Sioux Falls Career and Technical Education participating in a regional VEX Robotics Competition in Iowa and a Physics Quiz Bowl hosted by South Dakota State University.

Project Lead the Way Pathway to Engineering Program

At the CTE Academy in Sioux Falls, students enrolled in PLTW Engineering courses have new, exciting and cutting-edge opportunities both inside and outside the classroom with the addition of VEX® Robotics. VEX® Robotics equipment is a high quality platform with broad functionality that allows students to create more innovative solutions to problems. Not only will students use the equipment during the school day when everyone can participate, they will also have the ability to take part in the VEX® Robotics Competition, the largest and fastest growing middle and high school robotics competition in the world.



These competitions allow students to apply their robotics knowledge from the classroom in a unique, problem-solving environment.

Introduction to Engineering Design students have incorporated the use of VEX® Robotics as they learn to use 3D modeling software to build virtual models of the robots as they are assembling them in the lab. Robot designs include: a tumbler robot that can flip over at a wall and then drive upside down, a tank robot and a robot with an arm that can pick up a ball and score it in a goal. Robots can be controlled with a joystick or can be preprogrammed to drive in autonomous mode to navigate a predetermined course.

PLTW and VEX® supports the ROBOTC® programming language and has developed a scaffolded learning continuum that is widely recognized as one of the world's best solutions to introduce students to programming, an important skill set for students. ROBOTC® software provides students with an industry standard development environment which has been optimized for education.

South Dakota State University's Engineering Expo and Physics Bowl



On Friday, April 20th students in Sioux Falls Career & Technical Education Academy's Manufacturing and Engineering programs attended South Dakota State University's Engineering Expo and Physics Bowl at the Swiftel Center in Brookings. Student teams designed photovoltaic cannons that launch Ping-Pong balls, egg launching catapults, rocket cars, balsawood bridges, and hill climbing battle robots. Students also participated in on-site challenges such as an impromptu design challenge, a math competition and the Human Wallpaper contest where students duct tape a teammate to the wall (think shear strength of the duct tape!) Students also competed in the Physics Bowl.

CTE students won 1st place in the impromptu design competition and 3rd place in the rocket car competition. The CTE Physics Bowl team won 2nd place. CTE students were also represented on the 3rd place Roosevelt High School team and the 4th place Sioux Falls Home School team.

3. Can you give us some examples of opportunities that have been created for high school students to intern at TCUs, regental, private institutions, and STEM focused organizations? [Goal 2 Action] Are you working with Mel Ustad to attain this goal? Last year, you reported no collaboration with business or industry by high school students. Has this status changed?

Yes,

Sioux Falls program

Our Sioux Falls Biomedical Sciences program has started internships this year with Sanford Health. The primary goal of Sanford Health is to research cures for child cancers. This internship is not a direct result of EPSCoR; however it will be the beginning for future funding in the upcoming year IV, because Sioux Falls wants to expand into capstone courses.

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SF High School Researcher

By **Nicole Winters**
Published: February 21, 2012, 10:07 PM

SIoux FALLS, SD - While there are many extremely intelligent high school students, it takes a special student to be able to take on high school, college and an intense internship all at the same time.

One Sioux Falls senior is doing just that. She's not only excelling in her education, but she's also getting a jump in a possible future career by working alongside a Sanford researcher.

The human body and its system is a fascination for Beth Farnsworth.

"We're learning every part of the brain and we're going to learn all of the guts and spinal cord," Farnsworth said.

The high school senior is learning all she can from a specialized BioMed class at CTE.

"We focus on the anatomy of the body just like traditional anatomy class will, but then try to tie in more of the functions and more on what can go wrong with the human body so that we can eventually one day work to fix some of those problems," teacher Allison Hutchinson said.

Hutchinson teaches some of the BioMed classes. There's four levels to the program. But the school has only been in existence for two years, stopping Farnsworth from reaching the highest level, which would allow her to work alongside an area researcher.

"She approached me, actually, and said, 'I'm a senior. I know I can't take the next class. Is there anyway I could have that experience before I leave high school?'" Hutchinson said.

Farnsworth, being an exceptional student taking both high school and college classes, was allowed to take on a position interning alongside Dr. Haotian Zhao in the Sanford Research Center.

"Beth is helping me do a little project. She's generating some twos for the lab. The one she's working on is generating DNA-size standard to figure out the size of a piece of DNA," Zhao said.

"Gel electrophoresis, where you kind of see DNA fingerprinting, there's always a first column like a ruler of what each size is. So you're going to have the first column, which has one, two or three depending on if they're hetero or homo. So that first column is a DNA standard marker column, so that's what I'm making so I have to make each band separately. Then at the end, I'll put it all together," Farnsworth said.

It's a more complicated process than simple school work, but Farnsworth seems to understand it just fine.

"DNA fingerprinting, even parental tests, it's how you tell, like, would we be related. Or is my mother and I related? You need to have something to measure it on and how long the piece is," Farnsworth said.

Farnsworth collaborates with Zhao, a first for her working with a researcher and a first for him working with a high school student.

"In my impression, Beth is more mature. I don't have any difficulties communicating with her what I want," Zhao said.

Farnsworth works in the lab four days a week. Right now, she's learning about DNA, but in the future, she may even learn about brain cancer.

"My research is primarily involved in brain cancer research in pediatric patients. Beth hasn't touched that part yet, but in the future, she's going to be exposed to that," Zhao said.

It's experience many don't see until grad school.

"When I read her blog every week about all the things she's doing and how it ties to the greater picture of science and research, it's just really exciting to see," Hutchinson said.

Farnsworth is hoping her early start in science will help her reach her goals, which includes earning a doctorate and a medical degree.

"I love to work with special needs. So, if I can help that, not necessarily cure it, but help prevent some of the symptoms, help progression of the diseases that's my dream," Farnsworth said.

And while not everyone as young as Farnsworth is ready to jump into a lab, Zhao says it's critical to the future of science and medicine that those who have the motivation and focus give it a shot.

"We're hoping young people will get interested in our field of research and keep this thing going strong, especially in Sioux Falls," Zhao said.

Farnsworth says she has family and friends with disabilities and illnesses. That, too, has made her interested in science and medicine and has given her the motivation to keep learning.

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Welcome Education Leadership Teams!

STEM education leaders from across the country are gathering to inspire, collaborate & support your efforts to revitalize STEM education in your school. Teaching teams will create projects that seek to develop passionate, creative and skilled Science, Technology, Engineering, and Math students through the use of artistry and transdisciplinary teaching methods.

School teams are encouraged to prepare a preliminary project idea to compete for mini-grant funds. During the conference, teams will be given time to consult with a variety of STEM professionals to fine-tune their plans. At the end of the conference, mini-grant funds will be awarded to the Educational Leadership Teams with the most

http://stemwise.edec.org/[04/18/2012 9:17:53 AM]

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4. Please describe (location and focus) the STEM-camps that you have organized with university and tech college staff to provide information to high school students in assisting them to understand different careers. – or if you have such camps planned. If so, where will they take place? (– or have they taken place?) Have you been able to link these camps to internship opportunities? Which tech colleges, which universities have participated? [Goal 2 Action]

Year II:

East Dakota Educational Cooperative (Aviation Project)

This is an excerpt from a progress report.

Our project would not have been possible without the involvement of business and industry. They were involved in literally every aspect of the program, from the design of the project, to the final products. They identified subject matter for the professional development workshop that illustrated the standards being taught by teachers, and they shared their expertise with the selection of resources.

They also participated in the aviation/career guidance camps. Reps from business and industry were also involved in the establishment of potential internship and job shadowing sites, and the development of internship / senior project ideas. These will be shared on the SD STEM website in June.

We also had an engineer on board, ready to judge submissions from the RWDC [Real World Design Challenge]. Representatives from industry also gave us ideas for where to look for additional future funding. We have been pleased with our business and industry representation in our project, which included representation from airports, aviation businesses/ FBOs, and government entities, such as the Federal Aviation Administration and the National Weather Service.



Photos from the Aviation Camp held in April 2011



Student data from Aviation Education Days

80 Students attended, (Five teachers also attended)

74 Male, 6 Female

74 White, 4 Hispanic, 2 Asian

68 of the 80 used SD My Life for career and educational plan.

On a five point scale with one as very good and 5 as poor. Averaged result.

Overall Impression of Aviation Education Day: 1.81

Overall Impression of Presenters: 1.60

Lunch: 1.56

Overall impression of "How much did you learn about aviation: 1.58

Facilities: 1.55

Favorites: Tower visit (Madison group only). Air Guard Maintenance Facility (Kimball group only), Weather Service, History and Theory, Maintenance and airplane, Careers in Aviation.

Suggested Change: The only change suggested (except for a couple that put down more pizza, was to have more hands on activities. Students would like to actually fly or ride in aircraft.

5. Last year, you stated that Edgemont High School might offer a full STEM program. Did that happen? If so, please describe the challenges and opportunities associated with this program.

May 2010 Initial Contact

In our Year II grant application process, we awarded Edgemont's proposal to start a Computer Assisted Drafting Course. A retired engineer had moved to the area and was working with the school to start this program.

Edgemont is located in the south western part of the state near the Nebraska and Wyoming border. Years ago it was the location of a military base that shipped munitions during World War II and was the location of Uranium mining in the 50's and 60's. After the base closure and the end of Uranium mining, the area suffered hard economic times. The industry that remained in the area was the rail road and ranching. Recently, there has been a renewal of Uranium mining. The population of Edgemont has dwindled over the decades and program offerings are few.

June 2010 Program Development and Goal Setting

In June, I arranged to meet with the school district officials to work on program development. The South Dakota Department of Education works with school districts to have approved career and technical education programs. We can then collect data and utilize Perkins funding to support the program.

In attendance at this first meeting was Dave Courtney (Superintendent) and Jeff Scheinost (Instructor/retired engineer). During this meeting we discussed not only the project, but other options for the district. Those options included the possibility for implementing Project Lead The Way, expanding into the middle school, and creating an Introduction to Technical Education course for freshman.

At the conclusion of the meeting the district wanted time to explore their options and I proposed coming back in July.

July 2010 Program Development Follow-Up

Upon my return the next month the school district decided to move forward with the implementation with the middle school courses and Introduction to Technical Education course. Later, the district would begin to implement PLTW. We completed their approved program application and awaited the beginning of the project.

Fall 2010 Computer Aided Drafting Course Begins

The course started in the fall of 2010. There were 36 students involved in the project (8 were female) out of a high school population of 44.

January 2011 LEGO Robotics

As a part of an ongoing project, our office provided Edgemont with six robotics kits for their middle school program. This project, funded through Perkins Reserve funds, provides a seed program to generate interest into not only robotics, but into potential career interests.

May 2011 School Board Meeting

In April, I was invited to speak on behalf of the program to the Edgemont School Board. The district was interested in adopting another full time position for the instructor. Up to this point, the YMCA was paying the instructors wages. This was an important move, because of the harsh economic times; most school districts were removing full time positions. After the presentation and a closed executive discussion, the board later cast their votes publically to approve the position.

March 2012 Follow- Up Site Visit

In March 2012, I returned to Edgemont to follow up and see what the district had accomplished. This is what I found.

- The district is currently offering these courses:
 - Middle School Technical Education
 - Introduction to Technical Education
 - Electronics
 - Computer Aided Drafting
- They have articulation with Computer Aided Drafting with Western Dakota Technical Institute in Rapid City, SD.
- They were featured in the local news for their work with homemade solar panels
- They are considering expanding into utilizing VEX Robotics and Project Lead The Way.

From the Edgemont Herald Tribune

08 February, 2012

Solar Panel



Kyle Litzel, Leo Cope, David Kraus, Chance Englebert, and Matt Peters. Standing in back is instructor Jeff Scheinost

Photo and story by Mercedes Mohler

The solar panel helps keep the electricity bill down. The Edgemont High School alternative energy class has built a solar panel. Photovoltaic cells in solar panels convert light into electricity by absorbing photons of light from the sun and releasing electrons.

It took the six students six weeks to build, working one or two days a week. They made the solar panel because one of the requirements of the class was to build a solar collector of some type. The hardest part of the experiment was soldering the two thin wires down the front of the 36 photovoltaic cells. Teacher Jeff Scheinost said, "Next year in the alternative energy class I would like the class to build a wind turbine generator."

This year the class also built a parabolic solar concentrator and wind speed anemometers which were used to study different wind patterns on the school campus. This class is mainly about wind and solar energy but also covers other alternative sources such as geothermal, bio-mass, Hydro-electric, and ocean thermal land tidal generation.

The students like the projects, the projects help bring the concept learning in the class to life. There is a lab board for experiments, multi-meters for taking electrical measurements, soldering irons and other small hand tools used to build with.

A member of the class Kyle Litzel said, "I took this class because I wanted to learn about energy." He also said, "It was interesting because I have never built a solar panel."

Matt Peters said, I took this class because I thought it would be interesting." Peters also said, "It was a great learning experience."

6. Has SD MyLife been modified and/or expanded? How many students or how many schools participate in SD MyLife? Do students who go to schools on Native American reservations participate in this program? [Goal 2 Action]

SDMyLife

In August 2011, we added SDMyLife Network, a platform where students are able to connect directly with South Dakota professionals and businesses. Features of SDMyLife Network include company profiles, career coach message boards and work-based learning experiences (job shadows, internships, guest speakers, etc.).

On average, approximately 61,000 students in grades 7-12 have access to SDMyLife. Over the course of the year, about 75% of those students with access use the system (45,000 students) – the heaviest use is in 8th – 10th grade right now.

So far this school year, there have been 182,300 individual logins and 9,904,038 page views. Some of the schools with the most complete student portfolios in SDMyLife are from reservations schools. Through the College Access grant, these schools/students receive more support for their college & career readiness activities.



SDMyLife-College Access Grant

Through the College Access grant, 36 SD schools with high Native American student populations have received focused services to help these students be better prepared for success in their academics and careers. Through these efforts, these schools (which typically have had low usage of SDMyLife or similar activities) now mirror the career and academic planning activities across the state. In fact, under classmen are at these schools have been particularly involved in career exploration and academic planning activities.

- In terms of students' STEM career interests from College Access schools:
 - AFNR: 7%
 - Health Sciences: 17%
 - IT: 1%
 - STEM: 10%
 - Those percentages account for 2,844 students
 - STEM Pathways with particularly high interest (mirrors exactly that of the state-wide averaged schools) include Animal Systems (AFNR), Diagnostic Services (Health), Health Informatics (Health), Therapeutic Services (Health), Engineering & Technology (STEM) and Science & Math (STEM).

SDMyLife-Connecting with Students through South Dakota Public Broadcasting

In an agreement between the South Dakota Department of Education and South Dakota Public Broadcasting (SDPBS), SDPBS will research, write, develop and produce media components that will

highlight opportunities for postsecondary education at the four technical institutes. Public Broadcasting will focus on five main goals. Those goals are:

1. Have a strong focus on STEM programs and learning opportunities;
2. Illustrate the connections between k12, post-secondary and work force;
3. Highlight unique opportunities via South Dakota Virtual School that prepare students for the post-secondary;
4. Provide a high-level overview of state and local scholarships; and
5. Showcase opportunities for young people to work and live in South Dakota.

7. Are changes to the SD DOE funding program, Project Lead the Way, creating more of a pipeline to STEM majors in SD? If not, what are the challenges?

These changes are creating more of a pipeline.

Number of Programs

2011-2012 Programs

- 27 Middle Schools; increase of 1 program
- 34 High Schools; increase of 4 programs

Project Lead The Way Participation

- **Student Demographics**

Engineering	<i>Introduction to Engineering</i>	<i>Principles of Engineering</i>	<i>Digital Electronics</i>	<i>Civil Engineering and Architecture</i>	<i>Engineering Design and Development</i>
Canton[*]	15	16		7	
Sioux Falls[*]	36	25	1		
Brookings[*]	24	17			
LAMD	48				
Platte-Geddes	20	10			
Burke	8				

Bio Medical Sciences	<i>Principles of the Biomedical Sciences</i>	<i>Human Body Systems</i>	<i>Medical Interventions</i>	<i>Biomedical Innovation</i>
Sioux Falls[*]	44	33		
LAMD[*]	54			
Todd County	35	15		

[*] Certified Programs

- **Gateway Camps:**

School Year	Number of Camps	Students Served
2009-2010	3	54
2010-2011	6	109
2011-2012	8	160*

*Estimated based upon the total number of students pre-enrolled and the maximum amount of students allowed (20) per camp by PLTW.

- **Assessment:**

School	PLTW Test	Number of Students	Percentage of Students Passing	Number of Students Eligible for College Credit	Percentage of Students Eligible for College Credit
Brookings	IED, A	24	100%	NA	NA
Canton[*]	CEA, A	7	100%	NA	NA
	IED, A	21	95.2%	NA	NA
	IED, A+C	8	100%	8	100%
	POE, A	9	100%		NA
Lake Area Multi District	PBS, A	65	93.8%		NA
	PBS, A+C	27	NA	21	77.8%
Platte-Geddes	IED, A	21	71.4%	NA	NA
Sioux Falls CTE Academy[*]	PBS, A	52	98.1%		
	PBS, A+C	48	NA	27	56.3%
	HBS, A	22	95.5%	NA	NA
	IED, A	46	100%	NA	NA
	IED, A+C	46	NA	36	78.3%
	POE, A	22	100%	NA	NA
Total Number of Students Eligible for College Credit				92	

The difference between A and A+C is that students choose to take the C portion of final exam for College Credit.

[*] Certified Programs for the 2010-2011 School Year

Students Participating in STEM

STEM

YEAR	ENROLLMENT			SPECIAL POPULATIONS						
	Total Enroll	Total Males	Total Females	Disabled	Econ Dis.	SP	Disp Home Maker	LEP	Non Trad	Total Special Pop
2009-2010	3455	2146	1309	366	1160	0	0	51	1309	2886
2010-2011	3682	2339	1343	358	1194	0	0	50	1343	2945
% of Change	6.17%	8.25%	2.53%	-2.23%	2.85%	#DIV/0!	#DIV/0!	-2.00%	2.53%	2.00%

STEM

YEAR													Total
	Ind Male	Ind Fem	Asian Male	Asian Fem	Black Male	Black Fem	Hisp Male	Hisp Fem	White Male	White Fem	Pacific Male	Pacific Fem	
2009-2010	205	134	43	24	84	48	81	47	1733	1056	0	0	3455
2010-2011	206	140	41	35	75	38	93	49	1923	1080	1	1	3682
% of Change	0.49%	4.29%	-4.88%	31.43%	-12.00%	-26.32%	12.90%	4.08%	9.88%	2.22%	100.00%	100.00%	6.17%

Health Science

YEAR	ENROLLMENT			SPECIAL POPULATIONS						
	Total Enroll	Total Males	Total Females	Disabled	Econ Dis.	SP	Disp Home Maker	LEP	Non Trad	Total Special Pop
2009-2010	302	93	209	15	101	8	0	0	93	217
2010-2011	545	139	406	25	132	12	0	14	139	322
% of Change	44.59%	33.09%	48.52%	40.00%	23.48%	33.33%	#DIV/0!	100.00%	33.09%	32.61%

Health Science

YEAR													Total
	Ind Male	Ind Fem	Asian Male	Asian Fem	Black Male	Black Fem	Hisp Male	Hisp Fem	White Male	White Fem	Pacific Male	Pacific Fem	
2009-2010	23	27	2	4	3	0	0	3	68	172	0	0	302
2010-2011	18	47	1	1	0	12	0	13	120	333	0	0	545
% of Change	27.78%	42.55%	100.00%	300.00%	#DIV/0!	100.00%	#DIV/0!	76.92%	43.33%	48.35%	#DIV/0!	#DIV/0!	44.59%

Challenges

At this time, the following challenges for creating more of a STEM pipeline:

- **Post-secondary partners-** we have made many improvements over the past year with the post-secondary institutions in the state. Our goal is to continue making connections and establishing the capacity for students to receive either articulated credit or dual credit.
- **Industry partners-** we are growing students not only to fulfill the growing need in South Dakota, but to have industry support that growth. We have many examples of industry supporting our programs. For example: Daktronics in Brookings, 3M in Brookings, & Sanford Health in Sioux Falls. These industries support their programs; however we still need support in the smaller districts where industry is limited.
- **Establishing systems in remote areas-** We have been working more in remote areas to provide STEM education. The issues are that districts are remote and independent. We have a nine district consortium in the northwest part of the state that have to agree how this process will be done to move forward. We have provided presentations to first make them aware of the programs, options for implementation, goal setting, and funding possibilities.

Overcoming those Challenges

- We have one of our school districts, Sioux Falls, that has recently approved their Project Lead The Way courses to be of equal weight with the Advanced Placement courses. Sioux Falls is our largest school district.



SIoux FALLS SCHOOL DISTRICT

Policies and Regulations

NEPN Code: IKC

Instruction

Calculation of Grade Point Average (GPA) & Class Rank

It is recognized that there may be occasions when rank in class is beneficial to a student for college entrance requirements, scholarships and job applications. The student's rank in class shall be based upon placement within his or her graduating class based on the grade point average (GPA) scale. Therefore, class rank shall be computed at the end of each semester for each enrolled student. The class rank is based upon approved high school courses printed on the high school transcript.

A student's class rank shall be submitted to any institution, foundation or prospective employer only at the request and with the consent of the eligible student.

Weighted Ranking/GPA

The District will maintain for each high school student a non-weighted GPA with corresponding class rank and a weighted GPA with corresponding class rank.

Bonus points for AP courses and Project Lead the Way courses will be added to a student's GPA after the GPA has been calculated using a non-weighted system. Both weighted and non-weighted GPA and corresponding class ranking along with the date of calculation, will be printed on student transcripts and end of semester report cards.

Policy		Board Action	(formerly 5128)
adopted:	12-14-87	23816	
amended:	03-12-01	29800	
amended:	09-08-03	33633	
amended:	12-13-04	33981	
revised:	10-10-05	34227	
amended:	04-23-07	34711	
amended:	04-09-12		



Instruction

Calculation of Grade Point Average (GPA) and Class Rank

Computation of Non-weighted Grade Point Average

- A. All approved high school courses for which letter grades are awarded shall be used to calculate a student's grade point average (GPA). This will include courses that are retaken. If a student retakes/duplicates a course offering the higher and only the higher of the two grades will be applied to the student's GPA and credit calculations. Both grades, the original and retaken course, will remain on the student's transcript. Pass/fail and credit/no-credit courses shall not be used in calculating GPA.
- B. The non-weighted GPA shall be computed by taking the final grade of each course at the time credit is awarded and multiplying the amount of credit by the grade point equivalent. Grade point equivalents are:
- A = 4
 - B = 3
 - C = 2
 - D = 1
 - F = 0
- C. The scores are added and divided by the total number of credits to compute the non-weighted GPA.

Calculation of Weighted GPA

- A. Students shall receive bonus points added to their non-weighted GPA for all Advanced Placement and Project Lead the Way courses that they complete with a semester grade of C or better.
- B. In order to receive bonus points for a yearlong course, students must complete both semesters of an Advanced Placement course or Project Lead the Way course. Students in a yearlong AP course or Project Lead the Way course will lose the first semester bonus points if they do not complete the second semester of the course.

C. GPA bonus points shall be calculated as follows for a full year course:

Grade	Bonus Points
A	.015
B	.0225
C	.015
D	No bonus points

Calculation of Class Rank for Non-weighted and Weighted GPA's

There will be two class rankings for each student. One will represent the student's standing under a non-weighted GPA. The other will show class rank under a weighted GPA. Class ranks will be calculated at the end of each semester for which credit is awarded. The process as described below shall be used for both GPA ranks:

- A. The non-weighted GPA's and the weighted GPA's for all students will each be sorted from the highest GPA to the lowest. Ranks will be assigned in numeric order and be followed by the total number of students in the class, i.e. 6/423.
- B. If two or more students have the same GPA, they will carry the same rank. The rank of the GPA following a GPA that had two or more students achieving it will be the previous numerical rank plus the number of students achieving that rank. An example is provided below:

Non-weighted GPA	Number of Students Achieving	Rank
4.0	2	1/423
3.97	1	3/423
3.76	2	4/423
3.74	1	6/423

Regulation	Board Action	(Formerly 5126) (Class Rankings/Grade Point Averages)
approved: 12-14-97	23818	
revised: 02-12-01	29778	
revised: 09-08-03	33633	
revised: 12-13-04	33987	
revised: 10-10-06	34227	
revised: 04-23-07	34711	
revised: 04-09-12		