

# South Dakota Project Lead the Way Report 2011

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South Dakota Department of Education  
Office of Curriculum, Career and Technical Education

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# South Dakota Project Lead The Way Report 2011

The South Dakota Department of Education, in conjunction with area school districts, has actively promoted Project Lead the Way (PLTW) in South Dakota over the past three years. This report is intended to reflect the activities of South Dakota Project Lead the Way.

## Staff

Members of the Office of Curriculum, Career & Technical Education directly connected to South Dakota Project Lead The Way:

Mark Wilson, Director of the Office of Curriculum, Career & Technical Education

Becky Nelson, Team Leader [Curriculum]

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Brad Bies, Team Leader [Carl D. Perkins]

Raymond Tracy, State Leader for Engineering & STEM Cluster Specialist

Sam Shaw, State Leader for Biomedical & Science Curriculum Specialist

Brian Groote, Health Science Cluster Specialist

## Website

We established a website for anyone to visit. The website can be found at <http://doe.sd.gov/octe/sdpltw.asp>



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## What is Project Lead the Way?

Project Lead The Way (PLTW) prepares students to be the most innovative and productive leaders in Science, Technology, Engineering, and Mathematics (STEM) and to make meaningful, pioneering contributions to our world. PLTW partners with middle schools and high schools to provide a rigorous, relevant STEM education. Through an engaging, hands-on curriculum, PLTW encourages the development of problem-solving skills, critical thinking, creative and innovative reasoning, and a love of learning. The PLTW middle and high school STEM education programs give students a brighter future by providing them with a foundation and proven pathway to college and career success in STEM-related fields. STEM education is at the heart of today's high-tech, high-skill global economy. For America to remain economically competitive, our next generation of leaders must develop the critical-reasoning and problem-solving skills that will help make them the most productive in the world. PLTW sparks ingenuity, creativity, and innovation within all of our students. (*PLTW Website*)

### PLTW Results

- PLTW alumni study engineering and technology at 5 to 10 times the rate of non-PLTW students.
- PLTW students have a higher retention rate in college engineering, science, and related programs than non-PLTW students.
- 80 percent of PLTW seniors say they will study engineering, technology, or computer science in college, whereas the national average is 32 percent. (*PLTW Website*)



### Pilot School: Canton School District

South Dakota was the last state, out of all the states, to incorporate PLTW into any of our districts. South Dakota began with the Canton School District, which is located 20 miles south of Sioux Falls. This district of a little more than 250 students was willing to try PLTW. We began by sending the district's administration to Mankato, MN and Omaha, NE for site visits. The district decided that they wanted to offer two courses: Introduction to Engineering Design and Principles of Engineering.

In Canton, the district formed partnerships with local industry. One partner, Bidwell, a member of Terex, has supported the program. This partnership allowed industry to support the local program and to provide advice. This partnership allowed the school district to have community support for PLTW.

Before sending our instructors to the PLTW two week training, South Dakota decided that we could assist our instructors more by providing them with Autodesk Inventor training. Through this process, instructors are attending the two week training with a skill base. This preparedness has been positively commented on by instructors who have completed the course. We have also established an endorsement with the South Dakota Office of Accreditation and Teacher Quality.

The district sent two instructors to PLTW training. Both were nearing retirement. One instructor taught physics while the other instructor taught technical education. After the training, both instructors were excited and rejuvenated. *"This is as real as it can get and still be in school," PLTW Teacher Jim Martinson said. "It makes it easy for the students to see why they are learning. It gives them a better reason to want to learn."* (Sioux Valley News, Kari Elrod, Feb 2009)

This excitement carried over into the courses. The courses initially started with 22 students, and then enrollment declined to 14, because of various reasons. The students thoroughly enjoyed the courses. When school was called off due to snow days, the students would call their instructors to see if they could still go in and work on their PLTW projects. *"Some days the toughest part of teaching is getting the students out. They just want to stay and finish the project. It's amazing," PLTW Teacher Jim Martinson said. "It is so gratifying to have to kick kids out because they want to keep working."* (Sioux Valley News, Kari Elrod, Feb 2009)

### Advisory Panel

We formed an Advisory Panel that met in April 2009. The panel consisted of school districts, industry personnel from the medical field, electronics companies, postsecondary institutions and the Department of Education. We were given an overview of PLTW and



Figure 1: Photo Courtesy of the Sioux Valley News

we were able to network with each other. We are planning future panels with a smaller group with more of a focus on advisement for the Department of Education.

### 3-D Printer

The South Dakota Department of Education further assisted the district through assistance in purchasing a 3-Dimensional printer. This printer was essential in the reverse engineering units in the PLTW curriculum. The printer actually melts plastic at approximately 200 degrees to make 3-D objects, giving students a better idea of what engineers actually look at in their work. The printer also helps



Figure 2: Photo Courtesy of the Sioux Valley News

students see if their ideas are actually going to work. *“The printed pieces make it easier to see if a project is going to work,” PLTW Teacher Jim Martinson said. “It is amazing how it all works and it really shows us how engineers work. It is amazing to have the real thing in your hand.”*(Sioux Valley News, Kari Elrod, May 2009)

### Canton Program Certification

In the spring of 2009, the Canton School district chose to become a certified PLTW program. We established a date and invited PLTW program personnel to come to Canton for a certification visit. During the visit, we determined that the district could add more courses in the future, but the district was a model for the inclusion of special populations for a district of its size. The district was officially certified in May of 2009.

### State Board of Education Meeting in May 2009

OCCTE then invited the district to present at the May State Board of Education Meeting in Sioux Falls, SD. During this meeting, the staff and students presented the success of this program. There were many benefits from this presentation. First, many districts learned of PLTW and the successes in the classroom; second, we discussed the prospects for academic credit; and third, the Board of Education endorsed the program.

*Canton Student Enrollment*

IED (Introduction to Engineering Design)					
		2008-2009		2009-2010	
		Semester 1	Semester 2	Semester 1	Semester 2
Female		3	4	5	4
Male		19	14	10	10
Total		<b>22</b>	<b>18</b>	<b>15</b>	<b>14</b>

POE (Principles of Engineering)					
		2008-2009		2009-2010	
		Semester 1	Semester 2	Semester 1	Semester 2
Female		0	0	5	3
Male		14	10	7	4
Total		<b>14</b>	<b>10</b>	<b>12</b>	<b>7</b>

BE (Biotechnical Engineering)			
		2009-2010	
		Semester 1	Semester 2
Female		3	3
Male		1	0
Total		<b>4</b>	<b>3</b>

## Sioux Falls School District

After the May 2009 Board of Education meeting, we received a call from the Sioux Falls School District inquiring about PLTW. The significance of this call has a huge impact in South Dakota. The Sioux Falls School District is our largest and most influential school district. The school district built the Sioux Falls Career & Technical Education Academy for high school students that will serve not only the district, but the surrounding area.



**Figure 3 The Sioux Falls Career & Technical Education Academy**

**Photo by Sioux Falls School** According to Christine Carlson, the PLTW engineering teacher, *“The Principles of Engineering course exposes students to some of the major concepts that they will encounter in a postsecondary engineering course of study. Students employ engineering and scientific concepts in the solution of engineering design problems. Students develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges.”*

The CTE Academy in the Sioux Falls School District has a current enrollment of 47 students in the Pathway to Engineering courses. Sioux Falls is currently planning on implementing more courses.

We also have a short student made film that describes the PLTW activities in Sioux Falls. The web link is [ProjectLeadTheWayF.mp4](#)

### Sioux Falls Student Enrollment

#### Engineering

2010-2011 School Year

#### Introduction to Engineering Design

Semester I

#### Enrollment

<b>Females</b>	4
<b>Males</b>	43
<b>Total</b>	47

2010-2011 School Year

#### Principles Of Engineering

Semester I

#### Enrollment

<b>Females</b>	2
<b>Males</b>	28
<b>Total</b>	30

### Sioux Falls Student Enrollment

#### Biomedical Sciences

2010-2011 School Year

#### Principles of Biomedical Sciences

Semester I

#### Enrollment

<b>Females</b>	38
<b>Males</b>	15
<b>Total</b>	53

2010-2011 School Year

#### Human Body Systems

Semester I

#### Enrollment

<b>Females</b>	20
<b>Males</b>	7
<b>Total</b>	27

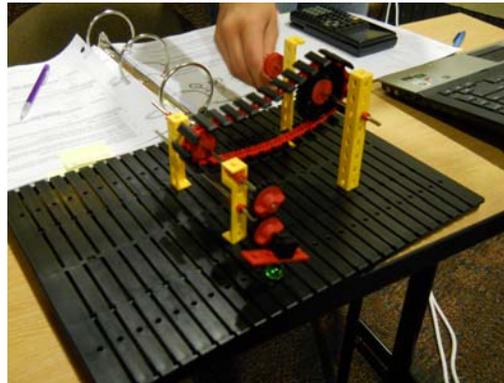
### Meeting the Needs of Rural Districts

In May of 2009, OCCTE met with Pat Leaveck of PLTW and John Olson of an Autodesk vendor. OCCTE determined at that time that we needed to have a road show across South Dakota. OCCTE created a plan that included a presentation at each of our technical institutes. We also discussed the price of Autodesk. South Dakota school districts are small and far apart. Many of our districts lease computer assisted drafting software. The cost-per-student ratio was too high and many of our districts were unwilling to consider joining PLTW, because of the costs associated.

As a result of this discussion, OCCTE decided to collect data and submit it to PLTW to show how many of our districts had 300 students and below for total enrollment. After we collected the data, we determined that an estimated 54% of our school districts were at or below 300 students. (South Dakota Dept. of Education, 2008)

Within the year since OCCTE submitted that data, the price of Autodesk decreased. Also, PLTW reviewed the equipment catalog and removed many unnecessary items that districts may not need, thus reducing higher overhead costs.

Our goals set in May of 2009 included a road show across the state to inform school districts about PLTW and its benefits. OCCTE chose to meet at the four area technical schools. They are located in Rapid City, Mitchell, Sioux Falls, and Watertown. As a result of the road show we were able to add a new program in Platte-Geddes.



**Figure 4 Student using engineering model**

**Photo by Christine Carlson**

## Platte-Geddes School District

The Platte-Geddes school district started their Introduction to Engineering Design course in the fall of 2010. This program has had great success. According to Eric Rolland, Introduction to Engineering Design instructor, *“The PLTW Intro to Engineering Design course that we are offering in Platte-Geddes has sparked student interest in the engineering process. The students really enjoyed the drafting portion of the course on Autodesk. Being able to print out their drafting creations on the 3D printer has also added to the overall experience of the class. Even students that may not have thought they would like computers and math have really excelled at the Autodesk drafting program. This program has been a great addition to Platte-Geddes school district’s class offering. Being exposed to engineering process has helped open the student’s eyes to the amount of time and thinking that goes into the products that they use in everyday life. Several students have had their interest in engineering confirmed and they have expressed that they are going to pursue it in college. Several other students although they are not going to go to college for engineering, have expressed that they really enjoyed the class and were happy to have the chance to take a class as interesting and progressive as the PLTW IED class.”*

Platte-Geddes is incorporating the next engineering course, which is Principles of Engineering, for the fall of 2011.

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*Platte/ Geddes  
Student Enrollment*

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2010-2011 School Year	
<b><u>Enrollment</u></b>	
<b>Females</b>	6
<b>Males</b>	18
<b>Total</b>	<b>24</b>

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## Lake Area Multi-District

Lake Area Multi-District has taken the initiative to start a biomedical program. Lake Area Multi-District serves students from nine area high schools which include: Florence, Castlewood, Henry, Hamlin, Grant-Deuel, Waverly, Summit, Great Plains Lutheran, and Watertown. Student from all of these schools have the opportunity to participate in the biomedical program. Lake Area Multi-District will also be adding the pre-engineering program during the 2011-2012 school year. This program has shown great success.

The Lake Area Multi-District instructor, Aaron Kromann, has assisted the Department of Education in developing the framework for core content elective credit.

*“Students who have taken this course are very energetic to complete all the activities outlined. Right now Lake Area Multi District is only offering Principles of Biomedical Sciences. Next year they plan to offer the second level course, which is Human Body Systems. Many of our senior students were disappointed when they found out they were going to miss out on having the opportunity to take the second level course. The other students are going to register for the second course. Many students enjoy this class, because it is different than a traditional classroom. It is project based with several hands-on activities. Many students enjoy doing the labs such as the heart dissection, working with bacteria, or analyzing DNA with a gel electrophoresis, in which one student commented, “It feels like I am on an episode of House”. They also enjoy that the class is mostly group work with little lecturing. It challenges them to solve problems on their own.”* [Aaron Kromann, Instructor, Lake Area Multi-District]



**Figure 5 Lake Area Multi-District**

### Lake Area Multi-District Student Enrollment

2010-2011 School Year	
<b><u>Enrollment</u></b>	
<b>Females</b>	43
<b>Males</b>	25
<b>Total</b>	<b>68</b>

## Brookings School District

In October of 2009, OCCTE conducted a meeting in Brookings. The meeting included many school officials. This meeting also included many individuals from industry. For example, Daktronics, 3M, Larson Doors, and our university partners from South Dakota State University. This meeting was to first inform everyone on PLTW, and then we followed up with the district goals and capacity.

As a result of this initial meeting, the school district chose to become a PLTW school. In addition, 3M provided a \$25,000 grant opportunity for schools to use for startup costs. This grant is available in the city in which a plant exists.

The Brookings School District used the funds to begin the Introduction to Engineering Design course. They currently have 24 students taking this course. The district will be moving the class to a larger classroom and adding the Principles of Engineering course for the upcoming school year.



Figure 6 Article from The Brookings Register

### *Brookings Student Enrollment*

2010-2011 School Year	
<b><i>Enrollment</i></b>	
<b><i>Females</i></b>	6
<b><i>Males</i></b>	18
<b><i>Total</i></b>	24

## Dual Credit

OCCTE determined that students wanting dual credit opportunities had to apply out-of-state, because we just started PLTW. Once students earned their credit outside of the state, they could transfer that credit into a South Dakota University.

Students earning credit at a South Dakota University became a goal for our state. Since then, OCCTE has been working on creating partnerships with our four technical institutes through the South Dakota State Board of Education and the six state universities through the South Dakota Board of Regents.

Once enrolled, students successfully completing Project Lead the Way (PLTW) courses may apply for college credit from South Dakota State University. Three (3) semester credits can be awarded in the topic area of General Engineering and is subject to the following conditions:

- The student's high school must be certified by PLTW.
- The student has earned a grade of **85% or higher** on any PLTW courses
- The college credit exam must be taken and passed with a grade **of at least 70%.**
- The student has successfully completed all three courses in the sequence.

To apply for credit at Academic Evaluation and Assessment:

- Bring a copy of your PLTW transcript verifying the grades and exam score—documentation from the school. This will include a “Grade Verification” form that has been signed by the teacher.
- Complete the SDSU “Application for Placement Credit” form
- Pay a fee of [TBD].

When these steps have been completed, the equivalent course will be recorded on your transcript with an “EX” satisfactory grade for the appropriate number of credits. (South Dakota Board of Regents)

### Project Lead the Way Equivalency

PLTW courses	Required Score	SDSU Course Equivalent	Credit
Intro to Engineering Design	85% for Course & 70% on PLTW Course Exam	GE121, GE122, GE123	3 credits
Principles of Engineering			
Engineering Design & Development			

In addition, South Dakota aligned our system for graduation requirements. Previously, our graduation requirements overlooked Career and Technical Education. Our new system will provide students the opportunity to take Career and Technical Education courses and earn credit for graduation.

### House Bill 1190

House Bill 1190 was introduced to the legislature, in January 2010, to address how Career and Technical Education courses could be considered for core content credit and how those courses could be considered for the Opportunity Scholarship.

House Bill 1190 did pass in the legislature. This bill now allowed the South Dakota Department of Education to determine Career and Technical Education courses to be academic or core content courses. Since the passage of the bill, the Department of Education established a process for course approval.

The requirements are now outlined in South Dakota Codified Law (SDCL) 13-55-31.1:

A student may earn academic core content credit by completing an approved career and technical education course. Approval to offer credit for a career and technical education course must be obtained through an application process with the Department of Education. The Department of Education shall meet with the Board of Regents to determine final course approval. The application must include:

- (1) Course syllabus;
- (2) Standards-based curriculum;
- (3) Teacher certification; and
- (4) Assessment of standards by methods including end-of-course exams, authentic assessment, project-based learning or rubrics.

## The Opportunity Scholarship

The Opportunity Scholarship is a grant award of \$5,000 annually offered to students who achieve a high level of academic achievement. In order to have a chance to receive the scholarship students are required to take a sequence of rigorous coursework. If a district had a course that would possibly qualify for the scholarship, they submitted an application to the Board of Regents. This application required a full course outline or textbook, a connection to state developed math and science standards, and an end of course exam.

## Core Content Elective Credit

OCCTE began working on our framework that first compared PLTW course units, goals and objectives with South Dakota's math, science, and technical education standards. This framework was designed to give to districts who implemented PLTW, so they could submit this documentation to the Board of Regents in order to have an approved course that could be considered for the Opportunity Scholarship.

The current courses aligned in this manner are: Principles of Engineering, Principles of Biomedical Sciences and Human Body Systems for a science elective.

In January 2011, the applications for the Opportunity Scholarship were submitted to the South Dakota Board of Regents to be considered for the Opportunity Scholarship as an elective course. It is important to note that if a district submits an application of this nature, they must meet the following criteria:

- The course will count as the fourth science course required for the Scholarship and will not replace the commonly offered courses to include physical science, biology and chemistry or physics;
- The school district must be approved by both your department and by PLTW to teach the course;
- The teacher must be highly qualified in an appropriate science and must have completed the required PLTW training specific to the course(s) taught; and
- The school must meet the Department's requirements for continuing authorization including the expectations of student performance on the PLTW required final exam.

## Professional Development

OCCTE determined that our districts who implemented PLTW not only needed technical assistance with the core content area application, but also needed someone to coordinate professional development.

In August of 2010 South Dakota began to provide PLTW programs a program update prior to the beginning of the school year. Our programs are not only approved PLTW programs, but also approved Career and Technical Education programs. They must meet deadlines for goals, submit annual applications, enter performance data, and are eligible for funding through the Carl D. Perkins Act.

In October 2010, OCCTE determined the need for our programs to be trained in the certification process by Project Lead the Way. This training demonstrates the process needed to become a certified program with PLTW. This training prepares the districts for the application and process. It also promotes the promising practices of course alignment and adoption, utilizing advisory panels, and attending further required professional developments.

In addition to these trainings, we will continue to provide Autodesk Inventor training to update our instructors on the latest changes to the computer assisted drafting software. This training is conducted in the spring to prepare our new teachers on the software before they go to the PLTW training during the summer.

## Project Lead The Way School Counselor & Informational Conference

South Dakota established our very first PLTW School Counselor & Informational Conference, which occurred on April 12, 2011. We worked with PLTW programs to send their counselors, teachers, and administrators to the first conference in Sioux Falls. These individuals were given an overview of PLTW and how the courses would benefit the students.



April 12, 2011 9:00 AM-3:00 PM  
(Registration begins at 8:30 AM)

## Project Lead The Way School Counselor & Informational Conference

Career & Technical Education Academy  
4700 West Career Circle  
Sioux Falls, SD 57104  
Room B110

### CONFERENCE PROGRAM

#### WHO SHOULD ATTEND

- School Counselors
- Administrators
- Curriculum Directors
- Career & Technical Education Teachers
- Science and Math Teachers
- Educators interested in STEM camp opportunities for middle school aged students
- Post-Secondary Educators
- School District Advisory Council Members and Interested Business Partners

THERE WILL BE NO CHARGE FOR THIS CONFERENCE-You may declare your intent to attend by e-mailing one of the contacts listed below.

*This counselor conference is designed to meet the requirements of the Project Lead the Way program and WILL qualify for required Project Lead The Way counselor conference attendance for Project Lead The Way program certification.*

#### **CONFERENCE PROGRAM:**

- 9:00-9:15** Welcome and Introduction: Mr. Ray Tracy, South Dakota Project Lead The Way State Leader
- 9:15-10:00** Project Lead The Way Keynote Speaker: Ken Maquire, Ph.D, Director of Marketing Development and Relationships, Project Lead The Way, Inc.
- 10:10:15** Break
- 10:15-10:45** Student Panel and Project Demonstration-Pre-engineering & Biomedical Programs
- 10:45-11:30** School Counselor/School Leadership Panel
- 11:30-12:30** Lunch (on your own)
- 12:30-1:00** Providing Opportunities for Women and Minorities through Project Lead The Way
- 1:00-1:30** Careers in Engineering: Mr. Shannon Schultz, PE - South Dakota Engineering Society
- 1:30-2:30** Project Lead The Way Partnerships
- 2:30-3:00** Gateway Academy-STEM Camps for your Middle School Students
- 3:00** Sioux Falls Career & Technical Education Academy Tour (optional)

For more information or to register contact:  
Ray Tracy, SD DOE, [Ray.Tracy@state.sd.us](mailto:Ray.Tracy@state.sd.us)  
Dick Hall, [dhall@edec.org](mailto:dhall@edec.org)

## EPSCoR

EPSCoR is the Office of Experimental Program to Stimulate Competitive Research (EPSCoR) that assists the National Science Foundation (NSF) in its statutory function "to strengthen research and education in science and engineering throughout the United States and to avoid undue concentration of such research and education."



EPSCoR identifies, develops, and uses a state's academic science and technology (S&T) resources to support its economic growth and promote a more productive and fulfilling way of life for its citizens. EPSCoR acts on the premise that universities, their science and engineering faculty, and their students are valuable resources that can influence a state's development in the 21st century. To achieve this goal, NSF collaborates with state leaders in government, higher education, and business to create partnerships that can bring lasting improvements to the state's academic research infrastructure and increase its national research and development (R&D) competitiveness. (South Dakota EPSCoR, <http://www.sdeprior.org/> )

South Dakota Department of Education has been working with South Dakota EPSCoR. OCCTE has been the facilitator of \$200,000 annually for five years. OCCTE provides funds to districts to develop rigorous programs with a postsecondary connection. Districts may apply to our office with proposals with an emphasis in STEM, Health Science, Agriculture, Food & Natural Resources and Information Technology. We have been able to fund districts to start and expand rigorous programs with these funds.

## Gateway Camps

OCCTE just started to implement the Gateway Camps in South Dakota. South Dakota offered three camps during the summer of 2010. They were held in June in Canton, Sioux Falls and Watertown. We found great success among the students and parents. One parent wrote the following:

*Dear Mr. Hall,*

*I wanted to let you know, in writing, how much my son Josh enjoyed the program this summer. His comment at the end of the week was "I wish regular school was like this". Thank you for investing the time, energy, expertise and funding into such a fun-filled yet thought inspiring program.*

*Thanks again for the great week. Josh only speaks with high-praise for the program. We look forward to attending next year if possible.*

*Cathy*

Gateway Academy | EDEC | ESA2

**EDEC | ESA2**  
East Dakota Educational Cooperative | Educational Service Agency Region 2

Gateway Academy - Learn More  
High Impact - Online Meal Payment

Gateway Academy 2011

- Sioux Falls Camp #1
- Sioux Falls Camp #2
- Rapid City
- Platte-Geddes Schools
- Brookings Schools
- Sturgis Schools

**GATEWAY ACADEMY SOUTH DAKOTA**

In June of 2010, South Dakota joined over 35 other states by offering Gateway Academy day camps. Camps were held in Canton, Sioux Falls, and Watertown, with 20 middle-school aged students attending.

**FULL 'STEM' AHEAD**  
Gateway Academy Summer Day Camp utilizes Project-Lead-the-Way's project based, hands-on, and real-world problem-solving approach to STEM learning that is 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**  
Gateway Academy sites are selected for providing leading-edge technologies that allow kids to explore disciplines such as robotics, aeronautics, and computer based design. While some sites will be in school districts that currently have Project-Lead-the-Way programs in place, Gateway Academy/South Dakota can assist any school district with a desire to host a Gateway Academy to do so. Districts hosting a camp may be provided staff, supplies, software and equipment for use during the camps. Schools hosting a Gateway Academy should incur minimal costs and students attend for free.

**WHAT KIDS WILL DO AT GATEWAY ACADEMY**

Have fun	-Make a human knot
Work in teams	-Build a desert shelter
-Use math and science to solve real-world problems	-Build a car that runs on solar energy
-Design, build, and test a rocket using 3D design software	-Create a spacecraft strong and light enough to land an "eggernaut" safely
-Program a remote control robot to navigate a maze and race against the clock	-Much, much, more

This upcoming summer we are expanding the number of camps to six camps around the state. We have also decided to make one of the camps specific to girls in engineering and another camp specific to ethnicities. We have also applied for the Society for Manufacturing Engineers grant to assist us with camps. We are very pleased with our successes and look forward to offering more enrichment camps. We have also created a web page to assist in registration and promotion of the camps.

### Camp Locations 2010

	Males	Females	Total
<b>Canton</b>	14	6	20
<b>Sioux Falls</b>	13	5	18
<b>Watertown</b>	12	4	16
<b>Total</b>	39	15	54

### Future Camp Locations 2011

Sioux Falls Career & Tech Ed Academy  
**May 13-27, 2011**

Sioux Falls Career & Tech Ed Academy,  
**June 6-10, 2011**

Platte-Geddes Schools,  
**June 6-10, 2011**

Rapid City (South West Middle School),  
**June 13-17, 2011**

Brookings,  
**July 11-15, 2011**

Sturgis,  
**June 20-24, 2011**

## SDMyLife

SDMyLife has been developed with one goal in mind: making a comprehensive career guide that people will truly enjoy using.

SDMyLife



<http://www.sdmylife.com/educators/index.asp>

While in school, we noticed a common problem among our peers—few of us knew what to do with our lives after graduation. Our understanding of our career options was very limited, and often based more on inaccurate stereotypes than the reality of the working world. To address these problems, OCCTE set out to create a career guidance resource that would have appealed to us when we were in school. Our aim with the initial version of SDMyLife was to develop a user-friendly program that combined comprehensive career information with the personal perspective provided by multimedia interviews with people in every occupation.

Over the years, OCCTE has responded to the needs of SDMyLife users by adding a number of additional features: first-class career assessment tools, a comprehensive post-secondary schools database, a financial aid section, the My Portfolio tool for students, and helpful administrative features for schools and districts.

The ongoing development of SDMyLife is a labor of love for all of our staff. It is our hope that SDMyLife will have a positive impact on the lives of everyone who use the program.

### **Who Can Benefit from SMyLife?**

SMyLife is suitable for people from age 11 to adulthood. It is a very user-friendly program and requires no special training or expertise. SMyLife is particularly useful for:

- **Middle school students** starting to learn about various career choices and the relationship between their schoolwork and the working world
- **Secondary school students** in the 9th and 10th grades investigating occupations and developing their career ideas
- **Secondary school students** in the 11th and 12th grades making decisions about training, postsecondary study, and work
- **College and university students** learning about careers related to their field of study
- **Unemployed adults and young people** evaluating their options
- **Employed adults** considering a career change

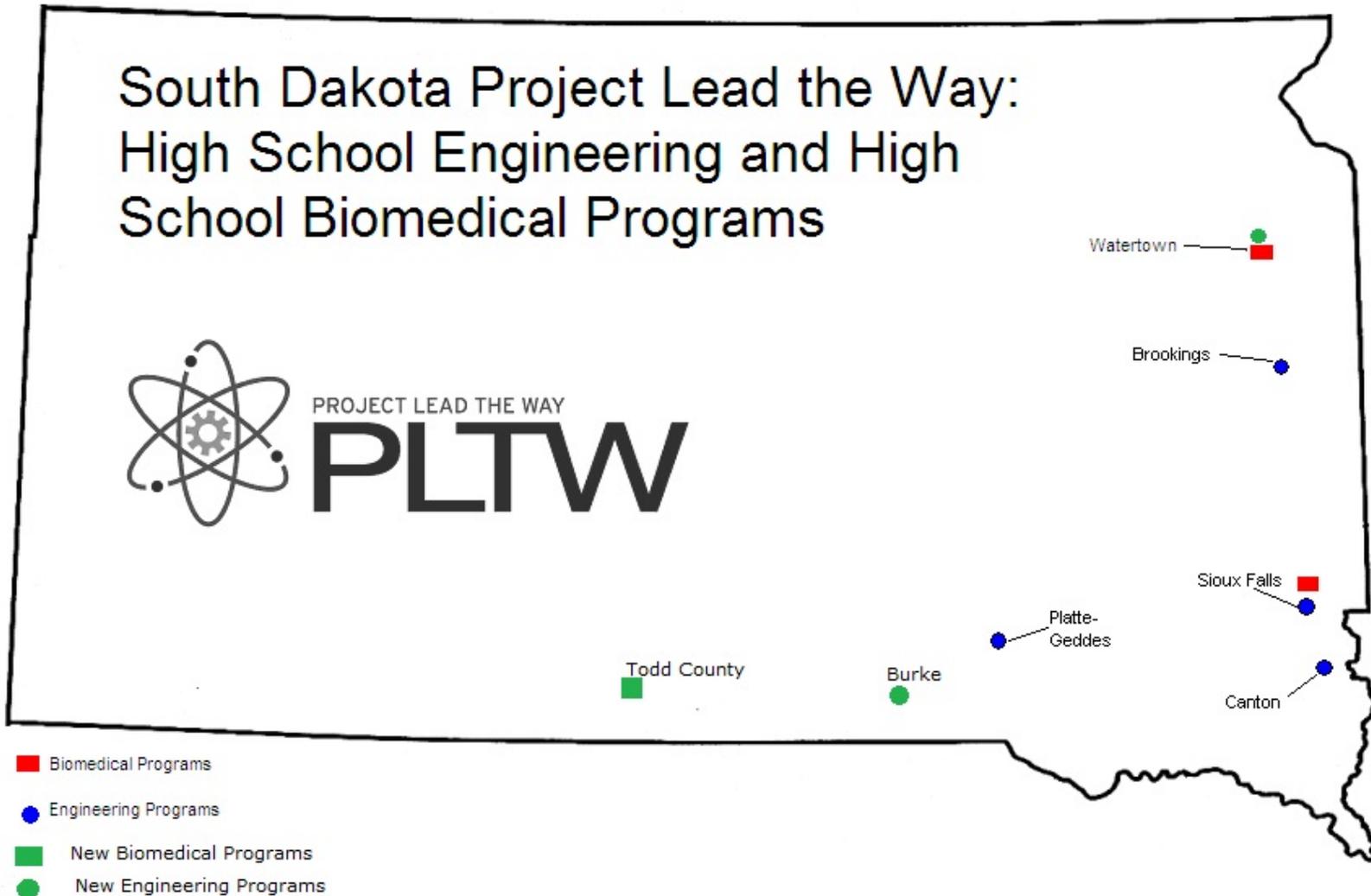
### **Individual Career Guidance**

SMyLife is designed for individual, self-directed use. The user-friendly interface helps users satisfy four key career guidance needs: career matching, career exploration, post-secondary education planning, and My Portfolio development.

Each of these sections can be used on its own. For instance, someone interested in exploring careers could spend days simply learning about different careers and viewing the multimedia interviews with people in those careers. (Career Cruising, Users Guide 2010, pp. 2)



# South Dakota Project Lead the Way: High School Engineering and High School Biomedical Programs



South Dakota

## South Dakota Project Lead the Way: Course Utilization by Program Site 2010-2011 School Year and New Programs Beginning 2011-2012 School Year

### Engineering

	Gateway to Technology	Introduction to Engineering Design	Principles of Engineering	Digital Electronics	Aerospace Engineering	Biotechnical Engineering	Civil Engineering & Architecture	Computer Integrated Manufacturing	Engineering Design & Development
Canton*	●	●	●			●	●		
Brookings		●							
Sioux Falls*		●	●	○					
Platte-Geddes		●	○						
Burke		○							
Lake Area Multi-District		○							

### Biomedical

	Principles of Biomedical Sciences	Human Body Systems	Medical Interventions	Biomedical Innovation
Sioux Falls	■	■	□	
Lake Area Multi-District	■	□		
Todd County	□			

#### Legend

- Engineering 2010-2011 School Year
- Engineering 2011-2012 School Year
- Biomedical 2010-2011 School Year
- Biomedical 2011-2012 School Year
- \* Certified Programs

## Performance on End of Course Assessment 2009-2010 School Year

### State-Level Statistics

Total Number of PLTW schools that have students assessed: **1**  
 Total number of PLTW students tested: **24** (41.7% Female, 58.3% Male)

PLTW Test	Number of Students	Number of Schools	Average Score	Number of Students Eligible for Dual Credit
Biotechnical Engineering Part A	*	1	*	N/A
Introduction to Engineering Design Unified	14	4	71.7%	9
Principles of Engineering Part A	7	3	70.7%	N/A

### National-Level Statistics

PLTW Test	Number of Students	Number of Schools	Average Score	Number of Students Eligible for Dual Credit
Biotechnical Engineering Part A	71	60	61.8%	27
Introduction to Engineering Design Unified	53,445	1,324	70.0%	29,459
Principles of Engineering Part A	3,352	228	66.3%	N/A

**Figure 6 Source: Project Lead The Way**

## Biomedical Courses

Principles of the Biomedical Sciences	Students investigate the human body systems and various health conditions including heart disease, diabetes, sickle-cell disease, hypercholesterolemia and infectious diseases. They determine the factors that led to the death of a fictional person, and investigate lifestyle choices and medical treatments that might have prolonged the person's life. The activities and projects introduce students to human physiology, medicine, research processes and bioinformatics. Key biological concepts including homeostasis, metabolism, inheritance of traits and defense against disease are embedded in the curriculum. Engineering principles including the design process, feedback loops and the relationship of structure to function are also incorporated. This course is designed to provide an overview of all the courses in the Biomedical Sciences Program and lay the scientific foundation for subsequent courses.
Human Body Systems	Students examine the interactions of body systems as they explore identity, communication, power, movement, protection and homeostasis. Students design experiments, investigate the structures and functions of the human body, and use data acquisition software to monitor body functions such as muscle movement, reflex and voluntary action, and respiration. Exploring science in action, students build organs and tissues on a skeletal manikin, work through interesting real-world cases and often play the role of biomedical professionals to solve medical mysteries.
Medical Interventions	Students investigate a variety of interventions involved in the prevention, diagnosis and treatment of disease as they follow the lives of a fictitious family. The course is a "how-to" manual for maintaining overall health and homeostasis in the body as students explore how to prevent and fight infection; how to screen and evaluate the code in human DNA; how to prevent, diagnose and treat cancer; and how to prevail when the organs of the body begin to fail. These scenarios expose students to the wide range of interventions related to immunology, surgery, genetics, pharmacology, medical devices and diagnostics. Each family case scenario introduces multiple types of interventions and reinforces concepts learned in the previous two courses, as well as presenting new content. Interventions may range from simple diagnostic tests to treatment of complex diseases and disorders. These interventions are showcased across generations of a family and provide a look at the past, present and future of the biomedical sciences. Lifestyle choices and preventive measures are emphasized throughout the course as are the important roles scientific thinking and engineering design play in the development of interventions of the future.
Biomedical Innovation	In this capstone course, students apply their knowledge and skills to answer questions or solve problems related to the biomedical sciences. Students design innovative solutions for the health challenges of the 21st century as they work through progressively challenging open-ended problems, addressing topics such as clinical medicine, physiology, biomedical engineering and public health. They have the opportunity to work on an independent project and may work with a mentor or advisor from a university, hospital, physician's office, or industry. Throughout the course, students are expected to present their work to an adult audience that may include representatives from the local business and healthcare community.

## Engineering Courses

### Tier 1 – Foundation Courses

Introduction to Engineering Design	In this course, students use 3D solid modeling design software to help them design solutions to solve proposed problems. Students will learn how to document their work and communicate solutions to peers and members of the professional community. This course is designed for 9th or 10th grade students. The major focus of the IED course is to expose students to the design process, research and analysis, teamwork, communication methods, global and human impacts, engineering standards and technical documentation.
Principles of Engineering	This survey course of engineering exposes students to some of the major concepts they'll encounter in a postsecondary engineering course of study. Students have an opportunity to investigate engineering and high-tech careers and to develop skills and understanding of course concepts. Students employ engineering and scientific concepts in the solution of engineering design problems. They develop problem-solving skills and apply their knowledge of research and design to create solutions to various challenges. Students also learn how to document their work and communicate their solutions to peers and members of the professional community. This course is designed for 10th or 11th grade students.

<b>Tier 2 – Specialization Courses</b>	
<b>Aerospace Engineering</b>	The major focus of this course is to expose students to the world of aeronautics, flight and engineering through the fields of aeronautics, aerospace engineering and related areas of study. Lessons engage students in engineering design problems related to aerospace information systems, astronautics, rocketry, propulsion, the physics of space science, space life sciences, the biology of space science, principles of aeronautics, structures and materials, and systems engineering. Students work in teams utilizing hands-on activities, projects and problems and are exposed to various situations faced by aerospace engineers. In addition, students use 3D design software to help design solutions to proposed problems. Students design intelligent vehicles to learn about documenting their project, solving problems and communicating their solutions to their peers and members of the professional community. This course is designed for 11th or 12th grade students.
<b>Biotechnical Engineering</b>	The major focus of this course is to expose students to the diverse fields of biotechnology including biomedical engineering, molecular genetics, bioprocess engineering, and agricultural and environmental engineering. Lessons engage students in engineering design problems related to biomechanics, cardiovascular engineering, genetic engineering, agricultural biotechnology, tissue engineering, biomedical devices, forensics and bioethics. Students in this course apply biological and engineering concepts to design materials and processes that directly measure, repair, improve and extend living systems. The BE course is designed for 11th or 12th grade students.
<b>Civil Engineering &amp; Architecture</b>	The major focus of this course is completing long-term projects that involve the development of property sites. As students learn about various aspects of civil engineering and architecture, they apply what they learn to the design and development of a property. The course provides teachers and students freedom to develop the property as a simulation or for students to model the experiences that civil engineers and architects face. Students work in teams, exploring hands-on activities and projects to learn the characteristics of civil engineering and architecture. In addition, students use 3D design software to help them design solutions to solve major course projects. Students learn about documenting their project, solving problems and communicating their solutions to their peers and members of the professional community of civil engineering and architecture. This course is designed for 11th or 12th grade students.

**Tier 2 – Specialization Courses, cont.**

<b>Computer Integrated Manufacturing</b>	The major focus of this course is to answer questions such as: How are things made? What processes go into creating products? Is the process for making a water bottle the same as it is for a musical instrument? How do assembly lines work? How has automation changed the face of manufacturing? As students find the answers to these questions, they learn about the history of manufacturing, a sampling of manufacturing processes, robotics and automation. The course is built around several key concepts: computer modeling, Computer Numeric Control (CNC) equipment, Computer Aided Manufacturing (CAM) software, robotics and flexible manufacturing systems. This course is designed for 10th, 11th or 12th grade students.
<b>Digital Electronics</b>	This course is the study of electronic circuits that are used to process and control digital signals. Digital electronics is the foundation of all modern electronic devices such as cellular phones, MP3 players, laptop computers, digital cameras and high-definition televisions. The major focus of the DE course is to expose students to the process of combinational and sequential logic design, teamwork, communication methods, engineering standards and technical documentation. This course is designed for 10th or 11th grade students.

**Tier 3 – Capstone Course**

<b>Engineering Design &amp; Development</b>	This capstone course allows students to design a solution to a technical problem of their choosing. They have the chance to eliminate one of the “Don’t you hate it when...” statements of the world. This is an engineering research course in which students will work in teams to research, design, test and construct a solution to an open-ended engineering problem. The product development life cycle and a design process are used to guide and help the team to reach a solution to the problem. The team presents and defends their solution to a panel of outside reviewers at the conclusion of the course. The EDD course allows students to apply all the skills and knowledge learned in previous Project Lead The Way courses. The use of 3D design software helps students design solutions to the problem their team has chosen. This course also engages students in time management and teamwork skills, a valuable set for students in the future. This course is designed for 12th grade students.
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Health Science Related Careers  
Current Careers Interests from SDMyLife  
February 2011

<b>Career</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
Pharmacy Technician	1027	436	591
Hospital Service Worker	674	239	435
Microbiologist	536	232	304
Health Records Professional	455	67	388
Biochemist	356	205	151
Biotechnologist	155	94	61
Bioinformatics Specialist	150	85	65
Toxicologist	55	28	27



STEM Related Careers  
Current Careers Interests from SDMyLife  
February 2011

<b>Career</b>	<b>Total</b>	<b>Male</b>	<b>Female</b>
Aerospace Engineer	563	522	41
Mechanical Engineering Tech	546	502	44
Computer Engineer	515	459	56
Chemical Engineer	493	423	70
Engineering Tech	459	370	89
Mechanical Engineer	423	381	42
Petroleum Engineer	415	328	87
Electrical Engineer	368	334	34
Civil Engineering Tech	347	312	35
Civil Engineer	317	288	29
Biomedical Engineer	290	207	83
Environmental Engineer	250	177	73
Mining Engineer	213	175	38
Industrial Engineer	185	144	41
Industrial Engineering Tech	119	95	24
Petroleum Engineering Tech	87	74	13



## Where do we go from here?

- Disseminate to “Decision Makers” the positive program opportunities that exist in PLTW.
- Begin to establish “Dual Credit” opportunities.
- Pursue statewide funding opportunities for districts to begin and expand their programs.
- Offer more camps for all youth to expand their interest.