

Creating the “STEM Pipeline”

South Dakota EPSCoR
in partnership with
SD Department of Education

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SD EPSCoR

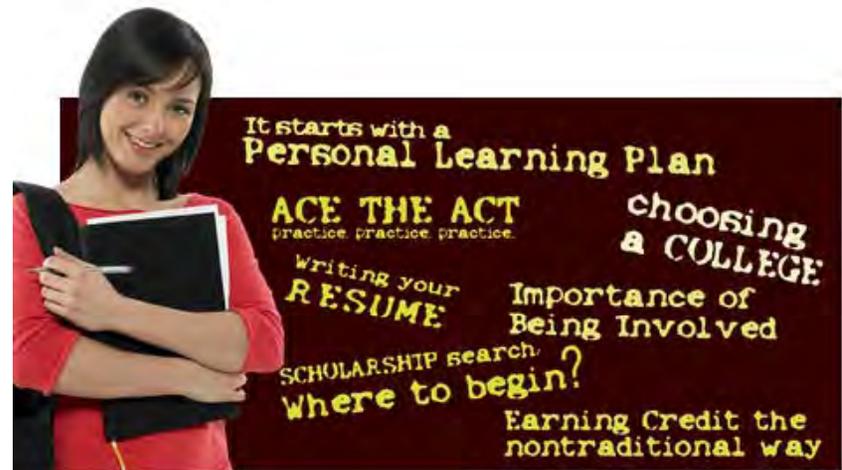
- SD EPSCoR funds rigorous programming to engage students in the problem-solving and research-focused courses, camps and competitions which spark or enhance students desire to pursue post-secondary education in STEM fields.
- How does South Dakota know what fields students are interested in?
 - SDMyLife



SDMyLife.com

- Career & academic planning
 - 7th – 12th graders (and their educators/parents)
 - All SD schools – Public, Private and BIE
 - 61,000+ students

SOUTH DAKOTA
MyLife



South Dakota
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SD My Life

- Provides grounds to:
 - Explore careers, postsecondary options and scholarships
 - View current employment listings
 - Prepare for the ACT
 - Log academic, extracurricular, service and work experiences
 - Create resumes
 - Design Personal Learning Plans



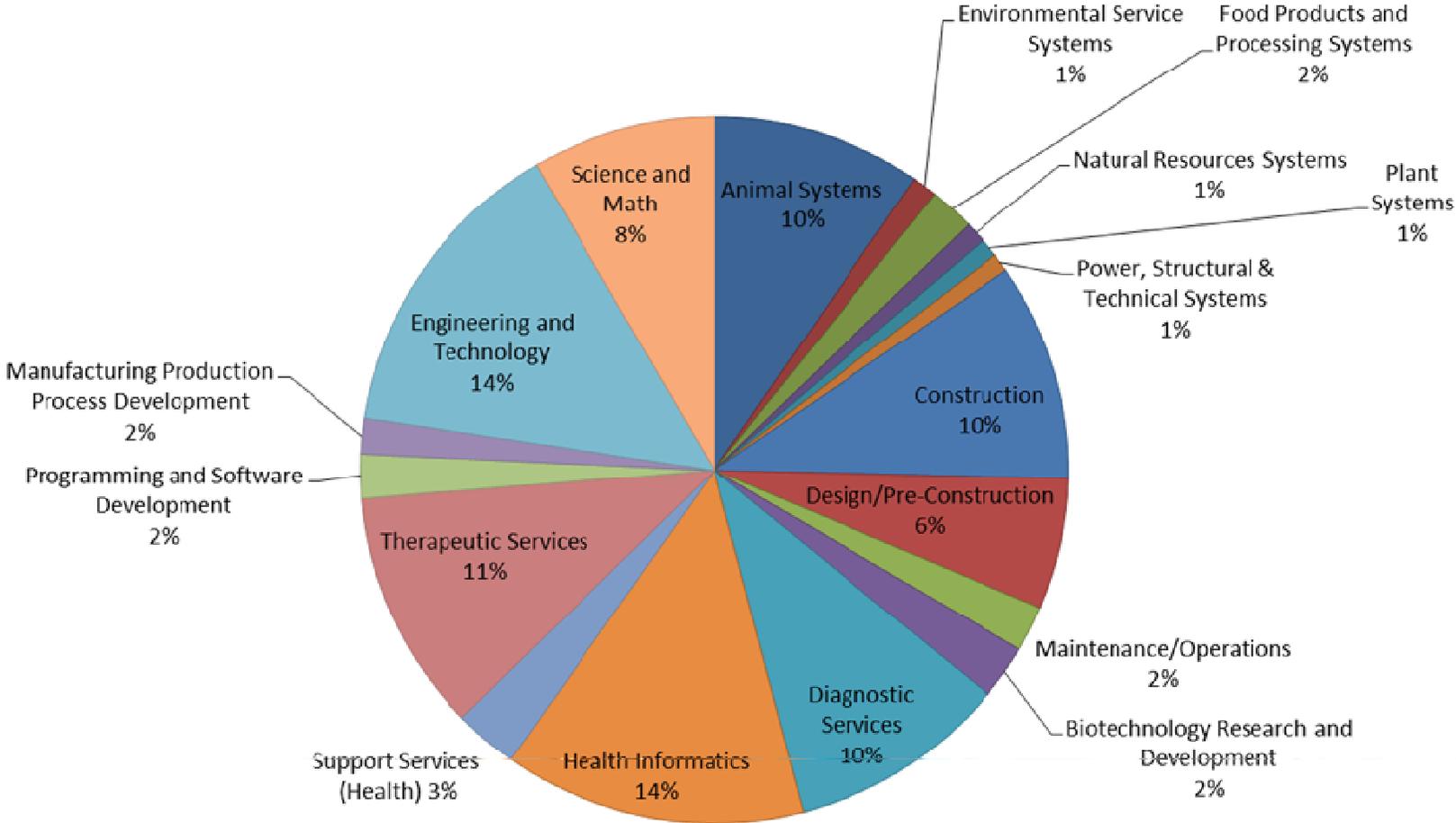
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SDMyLife data: Student Interest in STEM

| Total Students with Interests per Cluster/Pathway | |
|---|--|
| 1,555 | Agriculture, Food & Natural Resources |
| 1,814 | Architecture & Construction |
| 4,055 | Health Science |
| 203 | Information Technology |
| 164 | Manufacturing |
| 2,279 | Science, Engineering, Technology & Math |
| 10,070 | Total students that have started a PLP with STEM as their main focus (as of 5/12/11) |
| 16.43% | Percentage of 7th - 12th grade students who have started a PLP that list a STEM Pathway as their main area of interest (as of 5/12/11) |
| 61,304 | Total Students 7th - 12th grade in SY 2010-11 |



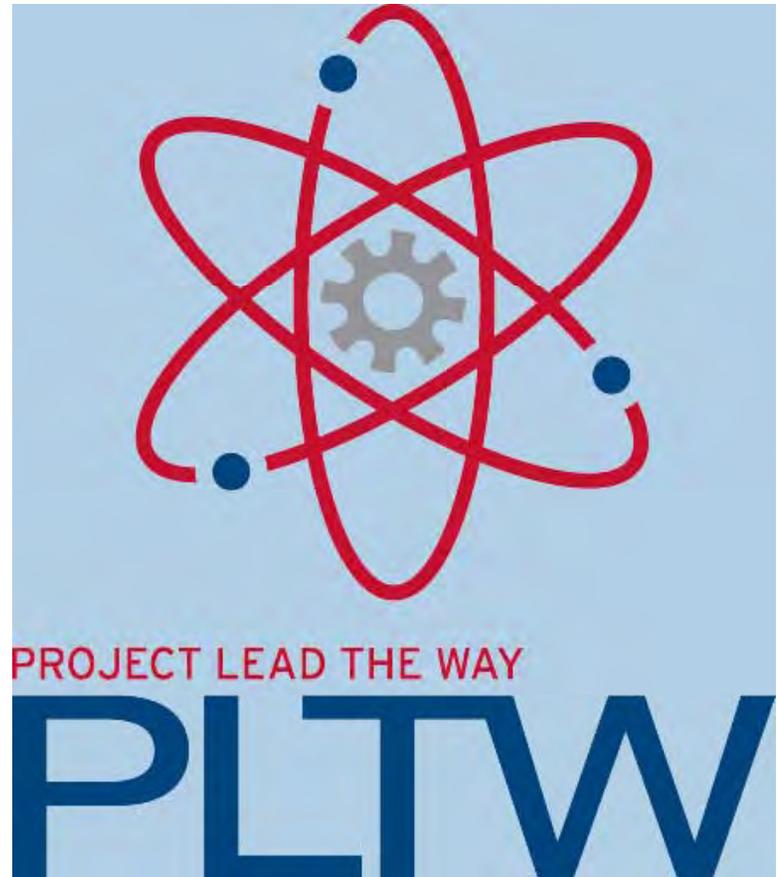
Students with STEM Interests by Pathway



Interest in STEM

- SD EPSCoR in partnership with SD DOE sparks or enhances interest to pursue post-secondary education in STEM fields by providing rigorous programs.
 - To “fill and maintain the STEM Pipeline”
- SD EPSCoR funds STEM programs including but not limited to:
 - Project Lead The Way
 - Gateway Camps
 - LEGO Robotics and VEX Robotics
 - Innovation Lab Schools





Project Lead The Way

- Project Lead The Way (PLTW) is the leading provider of rigorous and innovative Science, Technology, Engineering, Mathematics (STEM) education curricular programs used in middle and high schools across the U.S.
- Engineering courses for high school and middle school
- Biomedical courses for high school only



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PLTW advertisements

- Biomedical Science
- Engineering



*Videos were created by students at CTE Academy in Sioux Falls, SD



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PLTW Post-Secondary Connection

PLTW middle and high school programs provide students a foundation and proven pathway to college and career success in STEM-related fields.

- 80% of PLTW seniors say they will study engineering, technology, or computer science in college, whereas the national average is 32%. (pltw.org)



PLTW in South Dakota

Students can earn:

- **Dual credit** - South Dakota State University will provide 3 credits in General Engineering
- **\$5,000 Opportunity Scholarship** - to entice students to attend South Dakota public universities

Highly Qualified Teachers:

- PLTW holds intensive 2-week certification trainings
- Teacher must also pass PLTW content knowledge test AND praxis test for particular subject area

PLTW Summative assessments:

- held for national comparison and for Dual Credit opportunities
- SD outscored national average by 5% on Principles of Engineering exam



PLTW Impact

2010-2011

- 228 students took PLTW courses
- 5 districts participated
- 2 of 5 districts are rural
- 12 PLTW courses offered

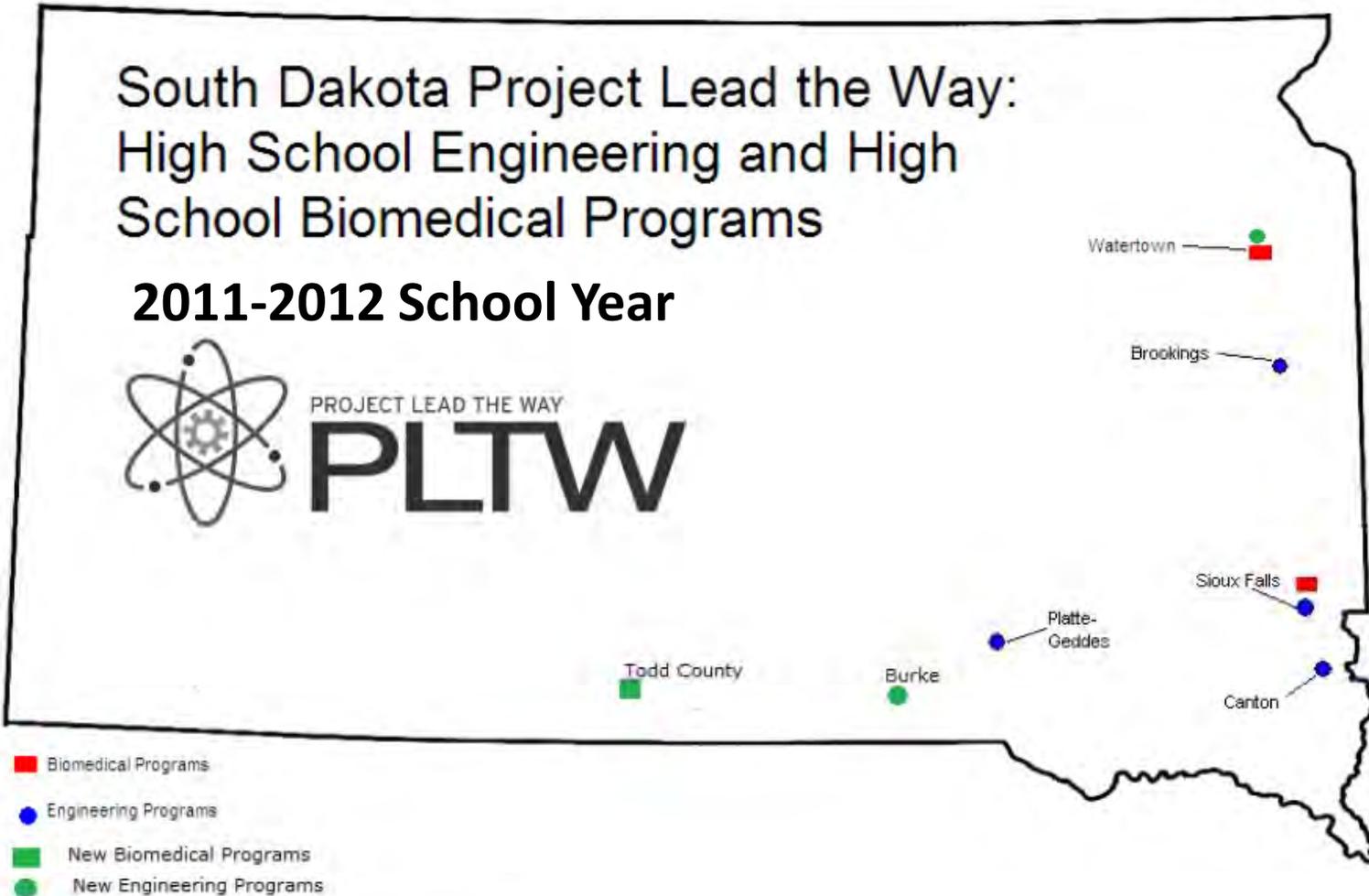
2011-2012

- 19 PLTW courses offered & added 2 districts



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

2011-2012 School Year



South Dakota



Middle School “Gateway Camps”

- Utilize Project Lead The Way approach to STEM education
- Involve middle school students in engineering design process and create pipeline for PLTW high school courses
- Students solve problems in engineering and health science through activities involving:
 - Robotics, Shelter Survival Challenges, 3-D Modeling, Dissection, and Bridge Building



Gateway Camps cont'd

- 2010 – 3 camps, 54 students
- 2011 – 5 camps, 80 students
- 2012 – a total of 8 camps will be offered

New Research connection*

- The upcoming 2012 camps held in Sioux Falls will expose students to research at Sanford through the PROMISE program (next slide)



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Sanford PROMISE program

Program for the Midwest Initiative in Science Exploration

- Connects the communities in our region with new frontiers in science and research

Innovation Lab Schools Program - EPSCoR funded distance technology and training for educators to allow rural schools to connect to real life research opportunities provided by PROMISE

***4 rural schools w/ approx. 1000 students



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Sanford PROMISE program

Student Research Examples:

- Isolating plant protein thought to have chemopreventative properties
- Diagnosing Diabetes
- Genetic Screening for married couple worried about transmission of rare genetic disease
- DNA analysis to identify and isolate potential vaccine targets and test for vaccine efficiency (ELISA)
- Blood toxicology research to determine physiological effects of alcohol abuse



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Robotics

In 2010

- LEGO robotics kits were provided to all Sioux Falls middle schools
- 475 male and 475 female students participated
- Students involved also had opportunity to participate in SD First LEGO League
 - Existing statewide competition for robotics with annual scrimmages held at Augustana College in Sioux Falls



Robotics

2011-2012

- This school year, the VEX robotics program is starting in 3 districts as part of PLTW engineering program

VEX will:

- Engage students in engineering design process
- Introduce the element of competition in the STEM fields through robotics challenges in the classroom



Please direct questions to the Office of Learning and Instruction (OLI)

PLTW Team - <http://doe.sd.gov/octe/sdpltw.asp>

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