

Science and Mathematics Teaching Center (SMTC)

Annual Report June 1, 2010 to June 1, 2011

Section 1. Introduction: The University of Wyoming Science and Mathematics Teaching Center (SMTC) is an intercollegiate, interdisciplinary program committed to excellence in K-20 science, technology, engineering, and mathematics (STEM) teaching and learning. The SMTC is jointly governed by the College of Education and the College of Arts and Sciences, with a Director and Coordinator as full time faculty. The Center's programs, projects, and outreach are supported by 90 SMTC Affiliate Faculty members drawn from four colleges: Agriculture, Arts and Sciences, Education, and Engineering. The SMTC pursues its mission of improving STEM teaching and learning through:

- **Master's Programs:** Master's of Science in Natural Science (MSNS) programs for Middle School Science (MSNS MSC), Middle School Mathematics (MSNS MMA), Teton Science School (MSNS NED), and Master's of Science in Teaching (MST) for secondary STEM teachers
 - **Endorsement Programs:** related to the master's programs are Wyoming Professional Teaching Standards Board sanctioned teaching endorsement programs in middle level science and mathematics and a collaborate with College of Education OTE for secondary biology certificate
- **Grant Funded Collaborative Projects:** K-12 schools, community colleges, universities, and informal science education collaborative programs that provide content-based professional development for STEM teachers
- **Research:** on issues related to STEM education
- **Resource Center:** providing information on STEM teacher resources and professional development opportunities <http://smtc.uwyo.edu/>

The SMTC has excelled in these five initiatives over the past year. The **Master's Programs** have maintained enrollments: MSNS MSC (18), MSNS MMA (16), and MSNS NED (4). We currently have 48 high school mathematics teachers from Colorado and Wyoming in the MST Secondary Mathematics program. This is an NSF supported collaborative virtual master's program with the University of Northern Colorado. All of these teachers will take ½ their course work from UW. In addition we have 2 science teachers in the on-campus MST program. **Grant funded collaborative projects** in which the SMTC is a partner or lead include two National Science Foundation collaborative grants (\$17,500,000), six Mathematics and Science Partnership (MSP) state level grants (\$643,289 for 3 that are concluding this summer and \$668,078 for 3 new MSP projects), and two Wyoming Educational Trust Fund projects (\$112,000). These projects involved over 20 UW faculty and graduate students from the Colleges of Arts and Sciences, Engineering, and Education, as well as Wyoming Community College faculty, in providing content based professional development to STEM teachers or conducting research on STEM teaching. SMTC roles in these projects include creation of a virtual

master's program for secondary mathematics teachers and research on student learning progressions in ecological education with a focus on quantitative reasoning. In addition, the SMTC provided a broadening impacts education component to two funded grants worth \$1,093,000. The SMTC partnered on two NSF grant submissions, EPSCoR and Computational Thinking for Teaching Computing in collaboration with the University of Colorado for \$6,999,717, as well as broader impacts components on UW grant submissions. **Research** funded by the NSF grants was conducted on effective distance mathematics education and quantitative reasoning in ecological education. The SMTC website serves as a **resource center** for STEM teachers, providing information on teacher professional development opportunities and on-line teacher resources. Below is a list of SMTC key accomplishments over the last year:

- Two funded NSF MSP collaborative projects: MSP LTER collaborative for \$12,498,243 and Math TLC collaborative for \$4,999,744. Partner on submittal of 2 new grants
- Three continuation funded Wyoming Department of Education Math Science Partnership (MSP) projects: QR STEM Project \$242,019, Carbon County Mathematics Initiative \$228,499, Engineering Approach to Teaching Science and Mathematics Project, \$172,771.
- Three newly funded Wyoming Department of Education Math Science Partnership Projects: Flooding the Field with Problem-based Learning, \$219,934 (with Converse County School District); Ready To Learn (RTL) Math \$224,351 (with Hot Springs County School District); and PLACE \$223,793 (with Carbon CSD #2, Natrona County School District and Laramie County School District #1).
- Broader impacts collaboration on multiple UW grants: Funded: GK-12 Project \$593,553, Agricultural Research Project \$500,000; Bacterial Cell Project \$163,127. Multiple new broader impacts partnerships on submitted grants.
- Strong MSNS programs with approximately 90 graduate students currently enrolled
- Established research program through NSF funding
- Hosted a national virtual seminar on quantitative reasoning in the sciences with speakers from 9 universities across the country.
- Creating and implementing a new virtual master's program for secondary mathematics teachers
- SMTC provided support for 11 graduate students through assistantships or foundation funds to students in Ph.D. and Master's programs, in addition to supporting 36 teachers in MSNS master's programs through foundation funds and tuition waivers

Section 2. Academic Planning Implementation: The following constitute action items for the 2009-2014 SMTC Academic Plan. These action items are drawn from current SMTC initiatives related to the University Academic Plan motifs and extended action items from the yearly SMTC academic plan.

1. *Assessment:* Develop and implement an assessment plan for the MSNS programs that will measure impact of the program on teachers practice, provide data to improve

programs, and indicate areas of need for teachers in Wyoming and the wider Rocky Mountain region

- Completed survey of state needs through web based needs assessment and focus groups, currently analyzing outcomes
 - Conducted a program evaluation through an alumni survey, analyzing outcomes
 - Implemented program entry, program portfolio, cohort interviews, program level course rubrics for MSNS programs, and exit interviews.
 - *Anticipated Progress:* continue to work on MSNS program assessment using pre-post testing within classes, surveys, assessment rubric, and focus groups.
2. *Grants:* Seek grants to support professional development and research
- Submitted 4 state grants (Mathematics and Science Partnerships, Teacher Quality Grants) with 3 funded
 - Submitted two national grant proposals in collaboration with other units at UW and with other universities, EPSCoR not funded other pending. We have achieved our goal of 2 funded NSF grants within a five year period; currently in third year of two NSF grants.
 - Created broader impact modules for NSF grants that provided for meaningful STEM education components that impact teacher practice and student learning
 - *Anticipated Progress:* Research on the characteristics of successful professional development and best practice for STEM in-service teachers is being conducted through the NSF Math TLC project. Research on learning progressions, quantitative reasoning in the sciences and professional development is being conducted through the NSF Pathways project.
3. *Graduate Programs - MSNS:* Expand current and explore potential new graduate programs serving in-service STEM teachers
- Piloted online STEM professional development courses both in the fall and spring meant to expand the MSNS Middle Level Science and Middle Level Mathematics programs into virtual regional programs.
 - *Anticipated Progress:* Actual expansion to regional programs is a long term goal which we are pursuing through development and piloting of such courses.
 - Maintained an enrollment of approximately 20 teachers in the MSNS MSC program and the MSNS MMA program.
 - *Anticipated Progress:* Despite extensive efforts, maintaining 20 teachers in the MSNS program is a challenge. Future action is to expand the program to serve the Rocky Mountain region.

- All but one course in the MSNS programs have permanent course numbers and PTSB endorsement options are approved.
 - *Anticipated Progress:* Pursue approval of final course over the next academic year.
 - Achieved minimal goal of 5 graduate students in MSNS NED program. Negotiating an expanded Teton Science School (TSS) partnership to increase number of graduate students per year in MSNS NED program through expanded scholarship opportunities and integration of courses with TSS; as well as partnering on state and regional environmental education and place-based learning efforts.
 - *Anticipated Progress:* Have 6 new TSS students for next year. Growth in the number of students is restricted in part by financial support issues created by extended support for Ph.D. programs in Science Education that reduces the amount available for the support of TSS students. Continue negotiations with donors for support and with TSS for tighter program coordination.
 - Implemented a new virtual graduate degree program for secondary mathematics teachers in collaboration with the University of Northern Colorado. Currently serving Colorado and Wyoming with goal of expanding to serve all of Rocky Mountain West region.
 - *Anticipated Progress:* Continue to seek opportunities to create a secondary science education program over the next year.
 - Supported revitalization of the Ph.D. programs in science education and mathematics education through participation in college-level restructuring plans and secured graduate assistantships through SMTC funding options.
 - *Anticipated Progress:* Pursue goal of generating 10 graduate assistantships and/or foundation support total over the next year. Lack of personnel resources in the SMTC will make it difficult to generate more grant and foundation funding.
4. *Research:* Establish a line of research for the SMTC
- Conducting NSF supported research into quality online professional development.
 - Conducting NSF supported research into quantitative reasoning and professional development in environmental sciences.
 - *Anticipated Progress:* Over the next 3 years we will continue to conduct research on online professional development and quantitative reasoning.
5. *Outreach:* The SMTC mission to improve STEM teaching and learning must expand beyond WY K-12 schools to include STEM learning for all Wyoming citizens in both formal and informal education settings.

- Explored collaborative outreach projects with SER with focus on energy education and ENR and TSS informal science education.
- Consulting on STEM education outreach aspects of the new Berry Biodiversity Center and the reformation of the Geology Museum.
- The SMTC Wyoming Natural Resources Education Advisory Board is partnering with the Wyoming Association for Environmental Education on work supported by a grant from EPA that focuses on environmental literacy and environmental education in schools.
- Consulted on NCAR-UW supercomputer project STEM outreach in mathematics and computational sciences.
- *Anticipated Progress:* Continue supporting STEM outreach in the SER and NCAR projects, including creation of a Mathematics and Computational Science Advisory Board.
- Mathematics and Science Partnership (MSP) QR STEM project developed partnerships with Wyoming school districts to provide sustained content-based professional development, using a model based on the Understanding by Design (UbD) framework.
- MSP Carbon County Mathematics Initiative developed a partnership between the two Carbon County school districts and UW to provide professional development for K-12 mathematics teachers in the districts.
- MSP Engineering Approach to Teaching Science and Mathematics provided professional development to elementary, middle and high school science and mathematics teachers with a focus on engineering and energy.
- Growing SMTC capacity: Approved Outreach Science Educator position and hired faculty into position. Requested from CPM an Outreach Mathematics Educator to provide content based professional development for K-12 STEM teachers and support additional grant efforts. Used release funds to hire Pete Ellsworth, former SMTC Coordinator, as SMTC science educator.
- Secured support from SER and UW for a full time State Science Fair Coordinator to organize and host the Wyoming State Science Fair, as well as work next year as a competition coordinator who works across Wyoming on increasing STEM participation. The Science Fair had nearly 300 participants in 2011. Competitions allow the SMTC to promote STEM education and provide professional development to teachers mentoring students, which relates to the SMTC mission. This person will also be involved in STEM Pipeline initiatives at UW.
- *Anticipated Progress:* Continue efforts to secure the mathematics education outreach position and secure long term funding for the competition coordinator

position to expand SMTC capacity, allowing us to pursue new STEM education opportunities.

6. *Articulation – K-16 STEM Pipeline:*

- *Anticipated Progress:* The SMTC is not pursuing the STEM Teacher Innovations Initiative since it has not received university support.
- *Anticipated Progress:* Consider resubmitting the NSF STEP proposal for funding expansion of the STEM pipeline through student recruitment and retention efforts. This effort is currently on hold due to SMTC faculty capacity issues.
- A Freshmen Interest Group with an interdisciplinary STEM focus was developed and offered, but did not make due to lack of student interest. After two attempts the SMTC abandoned this initiative.

Section 3. Teaching Activities: Over the past year the SMTC has encouraged high quality teaching and curriculum development by working with affiliate faculty to tie course outcomes to program outcomes and met with affiliate faculty to discuss MSNS program goals and program assessment. Affiliate faculty are not assigned to the SMTC so providing a reward for high quality teaching is not feasible. The following is some data on the SMTC master's programs:

- The SMTC Master of Science in Natural Sciences – Middle Level Science (MSC) is designed for elementary, middle school, and general science teachers who want to deepen their understanding of science concepts and environments that support teaching and learning science. The 24 hours of courses specifically designed for this program are offered only in the summer, though two courses were piloted on-line during the academic year.
 - Active Students: 31
 - Students graduating in past year: 6
- The SMTC Master of Science in Natural Sciences – Middle Level Math (MMA) was developed to expand math content knowledge and knowledge of appropriate pedagogy for instruction at the middle-level grades. Courses are offered on-line and in summers.
 - Active Students: 37
 - Students graduating in past year: 6
- The SMTC Master of Science in Natural Sciences – Natural Science Education is limited to students accepted into the Teton Science School Residency Program. Fifteen designated credit hours are completed through the Teton Science School Residency Program. For the remaining 15 credit hours on the UW campus, students work with a 3-member faculty committee to design a balanced program of study in selected science content, science pedagogy, and related coursework.
 - Active Students: 12
 - Students graduating in past year: 2
 - Students completing certificate option: 0

- The SMTC Master of Science in Teaching (MST) was developed for secondary science and mathematics teachers. A program designed for one teaching area (for example, chemistry or biology) must include 18 hours in that area; a program designed for two teaching areas must include 12 hours in/ or required by each area. The SMTC has expanded this program significantly by establishing the new Math TLC Master's Program for Secondary Mathematics Teachers.
 - Active Students: 8
 - Students graduating in past year: 0
- Graduate Enrichment Courses (NASC 5959) are taught by faculty approved by the SMTC Advisory Board who met the instructor application requirements of the Outreach School. The courses count for teaching recertification (PTSB) but cannot be used toward graduate programs. The courses provide professional development for teachers that expand their knowledge of science and mathematics teaching and learning.
 - Enrollments: 208
 - Enrichment Hours Generated: 295

The SMTC brings together faculty from the Colleges of Arts and Sciences, Education, Engineering, and Agriculture to develop content based professional development curricula for teachers across the state of Wyoming. The following are some specific activities in the area of teaching over the past year:

- Implementation of the Math TLC Master's program for secondary math teachers
- SMTC consulted with the planning and design committee for the Berry Biodiversity Center and Geology Museum on STEM outreach for teachers and students
- Articulation meetings for affiliate faculty teaching SMTC courses

Section 4. Research and/or Creative Activities:

Grants: The SMTC courses and programs are created and supported with grant funding, so this is a key creative activity for the center. The SMTC identifies funding opportunities in the area of STEM education, shares information on the opportunities with SMTC affiliate faculty, creates collaboratives of faculty from the Colleges of Arts and Sciences, Education, Agriculture, and Engineering to work on proposals, and assists in or takes a lead in submitting proposals. In addition, the SMTC has taken a leadership role in supporting the broadening impacts and outreach components of grants submitted by UW faculty from A&S, Engineering, and Agriculture. Over the past year the SMTC has submitted or partnered in submitting multiple grants. The following grants in which the SMTC was either a lead or partner were submitted and/or funded in the past year:

- NSF Mathematics and Science Partnership (MSP) program, Culturally Relevant Ecology, Learning Progressions, and Environmental Literacy for \$12,498,243 (funded with UW subcontract of \$749,683). National partnership with LTER sites to provide professional development for teachers focusing on environmental teaching/learning.

- NSF MSP program, Mathematics Teacher Leadership Center for \$4,999,744 (funded with UW subcontract of \$1,403,147). Create a virtual master's program for secondary teachers and a mathematics teacher leaderships program which are offered jointly by the University of Northern Colorado and UW.
- Three new MSP state level grants funded: Problem-based Learning, \$219,934; RTL Math, \$224,351; and PLACE, \$223,793.
- Mathematics and Science Partnership Title IIB project, Engineering Approach to Teaching Science and Mathematics Project, \$172,771. SMTC partnership with College of Engineering which offers professional development for teachers throughout the state. UW College of Engineering and College of Education faculty collaborate to integrate teaching modules developed by the National Science Foundation, National Aeronautics and Space Administration, Institute of Electrical and Electronics Engineers and the American Society for Engineering into a cohesive teaching curriculum for K-12 educators.
- Mathematics and Science Partnership Title IIB project, Quantitative Reasoning in Science, Technology, Engineering, and Mathematics Disciplines Project (QR STEM), \$242,019. QR STEM provides professional development to integrate and improve quantitative reasoning in high school biology, chemistry, earth sciences, and physics. Focus on Energy and Environmental issues.
- Mathematics and Science Partnership Title IIB project, Carbon County Mathematics Initiative, \$228,499. Offers professional development for K-12 mathematics teachers in Carbon County.
- Fremont County Consortium funded by Teacher Leader Quality grant. SMTC has subcontract to serve as the external evaluator for this professional development project.

The SMTC has collaborated on a number of grant submittals by supporting outreach and broadening impact components of the projects.

- NRE Agricultural Prosperity for Small and Medium Sized Farms Program for \$500,000 (funded), SAREC Agricultural Systems proposal submitted by Jay Norton with SMTC providing educational component
- NSF GK-12 project, Science Posse, \$593,553 (funded). Submitted by Don Roth, with SMTC providing educational component and SMTC Director serving as Co-PI
- NSF CE 21 Computational Thinking for Teaching Computing in collaboration with the University of Colorado for \$6,999,717 (pending)
- EPSCoR grant submitted by UW, \$20,000,000 with \$1,200,000 for Outreach (not funded).

Research: Two research studies are underway related to the national MSP projects, publication on online teaching of mathematics and collected interview data on quantitative reasoning in ecology. We are currently analyzing data on quantitative reasoning in science.

Publications, Presentations, and Curricular Materials: Director has two publications in the past year. He is currently working on a quantitative reasoning (QR) article for the first WISDOM^e monograph sponsored by Endowed Chair Larry Hatfield, and will edit the second monograph to focus on QR. The SMTC Director and SMTC Coordinator present at the State School Improvement Conferences and the State Mathematics and Science Teachers Conference every year. The Director made presentations at an international, national, and two state conferences. The Coordinator made presentations at four state conferences and a national conference. The Pathways project QR group at UW has created curricular materials including QR assessments and professional development materials. The Coordinator served on three of the national development teams for the Pathways project (Quantitative Reasoning, Cultural Relevance/Place and Citizenship) and co-chaired the Professional Development team.

Any presentations and publications by affiliate faculty based on SMTC grant projects and course activities are part of their home college faculty evaluation report and are not reported here. Affiliate faculty have presented at state, regional, and national conferences on SMTC projects.

Section 5. Service, Extension and Outreach Activities: Outreach to pursue excellence in the learning and teaching of science, mathematics, and technology is a primary mission of the SMTC. The following are the major SMTC service contributions for the past year to the college, university, state and the discipline, partnership with the Outreach School, and articulation/relations with Community Colleges.

- **International Service:** SMTC Director is on editorial panel for the International Journal for Technology in Mathematics Education. SMTC has developed a relationship with the Education Ministry of Bhutan and the Royal University of Bhutan and is assisting them in developing master's degree programs in science and mathematics education as well as exchange programs for UW students and faculty, and Wyoming teachers. A site visit supported by UW took place in March with four UW faculty members visiting Bhutan. Plan to work with Bhutan on creation of programs over the next five years.
- **National Service:** SMTC Director serves on Association of Mathematics Teacher Educators (AMTE) editorial panel. The NSF Pathways Project is a national collaboration with 8 universities and 4 Long Term Ecological Research (LTER) sites to study ecological education. The NSF Math TLC project is a collaborative master's program that impacts mathematics teachers across the Rocky Mountain west. Coordinator serves as a reviewer for the Rural Education Research Journal.
- **College Service:** Director serves on the Department Heads Committee for both Arts and Sciences and Education, the Leadership Committee for Education, and the hiring committee for the Endowed Chair in Literacy. The Coordinator serves on the hiring committee for the SMTC Director.
- **University Service:** Director served on the Berry Building Committee, NCAR Super Computer Project, Environment and Natural Resources Advisory Board, and NASA Space Grant Advisory Board. The Coordinator serves on the Shepard Symposium on Social Justice Steering Committee, the Grant Review Selection Committee for the

Haub School of Environment and Natural Resources, Student Research and Creative Activities Grants and the Berry Center Advisory Board.

- State Service: Director serves on the Wyoming Distance Learning state committee. The Coordinator consults for Fremont County school districts on professional development for teachers. Coordinator serves on the Board for the Wyoming Big Horn Basin Nature and Discovery Center, chairs the Wyoming Natural Resources Education Advisory Board, is a member of the Ellbogen Foundation Leadership and Advocacy Institute, and serves on the Wyoming Presidential Awards in Science and Mathematics, Selection Committee. SMTC through affiliate faculty provides outreach to K-12 STEM teachers across Wyoming. The SMTC is viewed by the state, school districts, and teachers as a source of support and information for STEM teaching and learning.
- SMTC cosponsors the annual state conference for mathematics and science teachers, the state robotics competition, the women in science conference, the Wyoming State Science Fair and the Sheppard Symposium on Social Justice.
- Outreach School: SMTC offers STEM content and education courses through the Outreach School for the MSNS master’s programs and continuing education courses for Wyoming and regional teachers, as well as through MSP grant projects. The new MST program supported by the NSF Math TLC grant has courses offered through Outreach.
- Community College: SMTC cosponsors the Biology articulation meetings with high school, community college, and college faculty. The QR STEM project partners UW with two community colleges to provide PD for STEM teachers.

Section 6. Student Recruitment and Retention Activities and Enrollment Trends:

The SMTC does not offer undergraduate programs. The MSNS master’s programs serve teachers who matriculate in the summer, so the OIA data may not coincide with the SMTC counts. Enrollment in the master’s program has remained strong.

- MSNS Middle Level Science program is at or near the capacity.

Year	00	01	02	03	04	05	06	07	08	09	10
Enrolled	20	22	20	19	15	18	16	19	20	20	18

- Summer 2011 Committed to attend: 18

- MSNS Middle Level Mathematics program was below capacity but enrollments have increased to near capacity.

Year	02	03	04	05	06	07	08	09	10
Enrolled	22	23	26	16	9	23	20	17	18

- Summer 2011 Committed to attend: 16

- MSNS Natural Science Education Concentration: The program enrollment goal is 5 to 10 per year.

Year	03	04	05	06	07	08	09	10
Enrolled	3	1	7	3	8	5	4	4

- 2011-2012 Committed to attend: 6

- MST program has very low numbers due to content courses being offered only Fall and Spring Semesters on campus, which does not serve the needs of many K-12 teachers. The new MST Mathematics program had 18 teachers in summer 09 cohort, with 6 registered as UW students.

Year	06	07	08	09	10	
Enrolled	1	1	1	6	10	

- 2011-2012 Committed to attend 14

While current enrollment in the MSNS programs is strong, we are concerned that restriction of the programs to Wyoming teachers and reduction in support due to underwater foundation accounts supporting teacher tuitions will impact the program. In addition the recent push to increase the Ph.D. program enrollment in Mathematics Education and Science Education is reducing the graduate assistantships available for recruiting TSS students. We are seeking additional foundation funding to support the programs, but have not had success in the past year. We are also working on moving the SMTC graduate programs to online programs that serve the Rocky Mountain West. The new MSP Mathematics Master’s program for secondary teachers serves as a model for moving to regional programs, by moving to online platforms and developing collaborative programs with other universities. The SMTC is working with UW Outreach and WICHE ICE to explore options for a science program for secondary teachers.

The SMTC has taken a strong role in expanding the Ph.D. programs in Mathematics Education and Science Education by assisting in program development, recruiting students, and securing graduate assistantships through grants and projects. Increasing the enrollment in these Ph.D. programs benefits the SMTC by providing additional graduate students who can work on and contribute to SMTC professional development projects.

Student recruitment is conducted through the SMTC Website, the SMTC list serve which allows us to send information to superintendents, principals, and science and mathematics teachers across Wyoming, state wide mailings of brochures for each program, presentations at state conferences, visits to schools, phone calls to individual teachers and administrators and word of mouth by satisfied teachers and graduate students. The SMTC actively recruits TSS graduate students through a face-to-face recruitment visit to Jackson in October followed by an invitation to visit campus early in the spring semester.

Section 7. Development activities and public relations.

Development: Development activities include the following:

- **Readiness:** We are currently developing a plan to seek funding for the State Science Fair, including continued support for a full time director. The SMTC Director and Coordinator survey grant opportunities with STEM education components within NSF and the Department of Education, sharing potential funding opportunities with departments across campus.

- Identification: done through the UW Foundation and the College of Education Development Office, we currently have two primary donors; future action is to construct a list of donors/foundations interested in STEM education
- Qualification: all potential donors are run through the UW Foundation
- Cultivation: will meet with primary donors currently supporting the program next year, soliciting new funding from our TSS supporter to support graduate students in MSNS program
- Solicitation: on-line giving link on the SMTC website and brochures for the SMTC and its programs; will conduct visits to current donors again next year
- Stewardship: all recipients of scholarships are required to write a thank you letter before receiving the funds; letters and phone calls with existing donors
- Leadership: the Director of the SMTC takes the leadership role in fund raising
- Teamwork: The SMTC collaborates with UW departments in submittal of grants and over the past year has received continued funding from NSF on one regional and one national partnership with other universities.

Public Relations: The SMTC disseminates information about projects and opportunities through its webpage, brochures, presentations at state meetings, and e-mail alerts sent to K-12 contacts throughout the state. Other public relation events include:

- Speakers: SMTC hosted a 40th Anniversary Celebration with a nationally recognized speaker and coordinated the campus presentation (in conjunction with the College of Education and the College of Business) by Mary Poplin, guest speaker on “High-Performing Teachers in Low-Performing Schools”. The SMTC through MSP funding will host Richard Duschl in August and Jay McTighe in September, two nationally known educators
- Newsletter: electronic newsletter distributed at least once a month and periodic announcements and updates are sent out via the list-serve
- Website: provides project information, graduate program information including on-line applications, affiliated programs, opportunities for teachers and students, and an on-line teacher resource center. The website is in UW format allowing updates to be done by the SMTC Office Associate with the assistance of University Public Relations.
- Annual reception for the Wyoming Science Teachers Association during the State Science Fair
- Annual picnic for the SMTC master’s students, affiliate faculty, and Advisory Board
- Sponsored events including: the NASA Women in Science Conference, the Biology and Mathematics State Articulation Meetings, the Wyoming Math and Science Teachers Conference, the State Science Fair, and the Shepard Symposium on Social Justice

Section 8. Classified and Professional Staffing: The staff and faculty are functioning at a high level. SMTC service to teachers in the state and faculty at UW gets excellent reviews. The current success in securing grants and growing enrollment in graduate programs would not have been possible without the dedicated efforts of the SMTC team.

The new Outreach Science Educator joining the SMTC next year will greatly increase the capacity of the SMTC in pursuing grants and offering professional development for teachers. In addition the full time Science Fair Coordinator position will increase our capacity to recruit K-12 students into STEM disciplines and support K-12 teachers.

Section 9. Diversity: A search was successfully conducted this year to fill the new Outreach Science Educator position. While extensive efforts were made to recruit underrepresented groups into the pool, they were not successful. We did hire a woman into the position. Graduate students for MSNS are recruited from existing teacher populations and TSS students, both of which lack ethnic diversity. The SMTC took a leadership role in recruiting Ph.D. students for a revitalized Ph.D. in Education with a Mathematics Education and Science Education focus. We solicited applications from Historic Black Colleges and Hispanic Serving Institutions across the U.S. We are currently working with Nell Russell and the newly created partnership with four HBUC to improve minority recruiting efforts. The SMTC is hosted a visit by 3 STEM teachers and a professor from Winston-Salem State University, a HBUC.

Section 10. Assessment of Student Learning: The SMTC has no undergraduate programs. Graduate programs include the MSNS programs and the MST program. Summer 2008 a pilot assessment program was implemented for the MSNS programs, excluding the MSNS TSS program. The MST program was not evaluated due to low enrollments. The new MST program for secondary mathematics education is assessed as part of evaluation for the NSF grant funding the program.

1. Identify **each undergraduate and graduate program** within your department and select the tier that best describes the current state of assessment for the program. After selecting the tier, provide an explanation of how you arrived at this particular conclusion and/or evidence to support your conclusion. The three assessment tiers are described below.

Master's of Science in Natural Science (MSNS) programs

- Middle School Science (MSNS MSC)
Tier 2: Over the last four years the SMTC has done extensive work on establishing a vision and plan for assessment. The SMTC has only affiliate faculty so establishing a culture of assessment is difficult, but we have been meeting with our affiliate faculty to discuss the assessment plan and enlist their participation in it. We are collecting diversified assessments of the program which have both indirect and direct components.

The SMTC has completed some analysis of the collected data, but needs to do more in this area. Outcomes have not been used to address change in the program and have not been a significant part of faculty conversations about the program. We only have two faculty positions in the SMTC making distribution of assessment

tasks impossible. This is a major concern for the SMTC and has been a primary reason why the assessment program is not progressing.

- Middle School Mathematics (MSNS MMA)
Tier 2: The assessment program for the MSNS MAA parallels that of the MSNS MSC. See MSNS MSC for explanation of rating.
- Teton Science School (MSNS NED)
Tier 3: This program has small numbers and is a collection of courses from both TSS and UW. We conduct exit interviews with students and use the feedback to make changes in the program and improve services. We focused on the MSNS MMA and MSC program assessment first since the numbers are more significant and the programs more structured. SMTC faculty capacity issues (only 2 full time faculty members) have restricted us from implementing an extensive assessment of the program.

Master's of Science in Teaching (MST) for secondary STEM teachers

- MST On Campus Program
Tier 3: This program has only 1 or 2 students a year and allows students to construct their own program using existing courses with only minimal requirements for number of STEM content courses and education courses. This makes the program very difficult to assess and has not been a high priority. We are in the process of moving this program to a virtual online program modeled after the MST Mathematics TLC Master's defined below.
 - Mathematics TLC Master's for Secondary Mathematics Teachers
Tier 1: This is a new program, only beginning its third year. The program is funded by an NSF grant so there is an entire research and project evaluation component dedicated to program assessment. The research and evaluation is focused on using the findings to impact course and program development. Thus the program has multiple forms of direct and indirect data, careful analysis of results which are shared with program constituencies, assessment is a significant part of the program culture, and assessment is clearly documented and is shared with reviewers outside of the program. The primary concern with assessment will be sustaining a continued effort after the grant funding is exhausted in 2 years.
2. What does your department need in terms of assistance over the next two years to develop more mature and successful assessment processes?

The SMTC needs assistance in determining how to spread the assessment burden beyond the two full time faculty in the center. So we would be interested in one-on-one consultation and best practices symposium. The SMTC plan is to distribute assessment of the MSNS MSC program to the new Outreach Science Educator joining us in Fall 2011, and the MSNS MMA to the Outreach Mathematics Educator we have requested through CPM this year.