

Proposal to Eliminate Academic Program

Pursuant to UW Regulation 6-43

Science Math Teaching Center (SMTC)

Statement of the reasons for elimination of the program:

The SMTC, a valuable asset to the Colleges of Arts and Sciences and Education and the university, is not necessary for maintaining national accreditation, nor is it necessary to the programs or to award the degrees offered. Although advanced degrees currently awarded by the SMTC do qualify recipients for several PTSB endorsements to a teaching license, these degrees could be just as easily housed in other existing academic and administrative units in the Colleges of Arts and Sciences and Education.

In the most recent decade, the SMTC has been in a gradual, sustained, and marked descent in terms of its research productivity, national and state reputation and alignment of mission with the broader field of STEM education.

The problems with the SMTC, however, aren't to be found in these surface level productivity statistics. Instead, the problems with the SMTC are composed of an inter-related set of issues that have led us to reconsider, even re-conceptualize, the potential of the SMTC if it were to be reconfigured with a new and broader university role in STEM education, and integrated with three of the university's current initiatives, Science, Engineering, and Education. Below are reasons why the SMTC as it now stands should be eliminated and slated for updating, re-visioning, and re-establishment as a university-wide P-16 STEM EDUCATION Center at UW.

There has been a decreasing number of affiliate faculty members who choose to run their grant applications or currently funded projects through the auspices of the SMTC.

Also, SMTC's current mission lacks alignment with more contemporary conceptualizations of science and mathematics education within the broader field of STEM or STEAM disciplines on and beyond the university campus. THE SMTC has failed to modernize its mission and connect the disparate bits and pieces of faculty and staff interests in STEM disciplines into a broader university-based STEM focus. Furthermore, having failed to connect to the larger focus of STEM, both the SMTC and the university have failed to build a coherent STEM organization on the campus that is prepared with the capacity to compete for large NSF, Department of Education, NIH, and other broader impact grants and contracts. This limits the amount of potential external funding available for research in STEM disciplines and in STEM education on the UW campus.

We believe that the original intent of the SMTC was to be a grant supported entity on the UW campus and not a state funded entity. Over time, financial support evolved to include a small amount of state funding to continue SMTC's functions in lean times and then expanded when additional duties were added. The Wyoming State Science Fair has become entangled with the SMTC for example. The Wyoming State Science Fair

would be better placed in a P-16 setting such as the Wyoming Department of Education, where its efforts would be synergistic with the other statewide and UW-wide efforts for recruiting and retaining outstanding Wyoming STEM majors.

The organization of the three master's degree programs into the SMTC is a somewhat aberrant organizational practice since degree programs are typically housed in academic units such as departments and colleges and not in centers, institutes or other academic units. The current masters degree programs offered in the SMTC, although productive, can be given departmental academic homes within current or even revised university college and departmental structures. As a result, the argument that the SMTC needs to continue in its current form to support existing graduate degree programs is also questionable.

Taken together, these subtle but important internal factors we have noted here, which are unrelated to the surface level statistics of program productivity, argue that the SMTC is in need of major transformation if not a complete overhaul of mission, personnel, physical location, etc. This realization is not to impugn the many past achievements of the SMTC leadership, faculty or staff—quite the contrary. **We believe the spirit and past functions of the SMTC should be retained, enhanced, and coalesced into a cogently designed university center or institute focused on P-16 STEM Education.** The Provost's Office will work with the three current university initiatives, Science, Engineering and Education, which could be combined with the past work of the SMTC and its supporters, as well as other groups such as WYSTEM, to support a **University P-16 STEM Education Center** to be potentially housed in the new Enzi Science Facility. This would allow UW to seek and obtain broader impact grants and contracts in STEM disciplines and to support improved STEM instruction within the P-16 educational community.

Consequently, after serious deliberation, it is our recommendation that the Science Math Teaching Center (SMTC) be eliminated at the University of Wyoming. As difficult as this decision is, it has been one that has been needed for several years now and will afford the University an opportunity to consciously design a vibrant new focus on P-16 STEM Education that involves and connects the many STEM interests on the UW campus and those of the P-16 educational community.

Description of the program and relevant data:

Describe the mission, curriculum, content and format of the program:

The Science and Mathematics Teaching Center was established to provide high quality professional development for Wyoming teachers in 1970 by a group of scientists concerned about the quality of K-12 education. As a collaboration between the College of Arts and Sciences and the College of Education, SMTC currently offers three master's degree programs, engages in outreach throughout Wyoming, collaborates with faculty to expand their broader impacts by providing professional development to teachers, conducts research with external funding and coordinates the Wyoming State Science Fair.

The Science Math Teaching Center (SMTC) housed on the UW Laramie campus has had a long and distinguished history of collaboration between two colleges, research and grant productivity, statewide service and engagement, graduate degree production, and leadership in policy and practice in math and science education nationally. For nearly fifty years, the SMTC has been nurtured by scores of visionary academics, who labored to bring into existence a center where the content fields of math and the life, earth, and physical sciences could engage productively with math and science educators to meet the needs of P-16 mathematics and science educators in the state of Wyoming and beyond. For many decades the SMTC enjoyed a national reputation attracting graduate students from across the U.S. to its programs and research projects.

The SMTC at UW is dependent upon a core of strong leadership that promotes collaboration between and among internal office staff and among a group of affiliate faculty members from the Colleges of Arts and Sciences and Education. The program has graduated 78 master’s degree students in the past 5 years in three graduate degree programs: Middle level science, Middle level math and Natural science education.

Graduates acquire a wealth of knowledge and competencies in this program that are transferrable not only to classroom teaching but also to leadership roles in math and science education within Wyoming, regionally, and nationally. These same graduates can, upon appropriate application, receive professional licensure endorsements through the Wyoming Professional Standards Teaching Board (PTSB) for mathematics and science education. Consequently, the degree programs housed in the SMTC are valuable assets to the Colleges of Arts and Sciences and Education. The SMTC also has an endowment of 1.3 million dollars and has generated over 10 million in external funding in the past six years.

a. Curriculum of the Concentrations in the Natural Science Major

Middle Level Science (MSC)		Credits
Summer 1	NASC 5120 Earth Science in a Global Context	3
	ASTR 4000 Astronomy for Teachers	2
	NASC 5300 Natural Science Assessment	2
	NASC 5400 Spatial Data and Instructional Technology	1
Summer 2	NASC 5130 Life Science in Global Context	3
	ENTO 5601 Insects for Teachers	1
	SOC 4890 Global Populations & Environments	1
	NASC 5320 Science, Technology and Society & Plan B Research	2
	BOT 4790 Field Techniques	1

Summer 3

NASC 5110 Physical Science in Global Context	3
NASC 5600 Math & Stats in Science Teaching	2
NASC 5510 Integrated Instructional Strategies	2
EE 4800 Energy Policies and Impacts	1
+ 6 additional credits for a total of 30 + a Plan B non-	
Middle Level Mathematics (MMA)	
MATH 5160* Social and Historical Issues	3
NASC 5205* Methods for Teaching Middle Level Math	3
NASC 5170 Connecting Geometry	3
NASC 5225 Assessment for Middle-level Math	3
MATH 5190* Mathematics of Change	3
MATH 5140* Numbers and Operations	3
NASC 5215 Technology	3
NASC 5185 Analysis of Data	3
+ 6 additional credits for a total of 30 + a Plan B non-thesis	
Natural Science Education (NED)	
ZOO 5430** Ecology of Yellowstone Ecosystem	3
ZOO 5420** Ecological Inquiry	3
NASC 5610** Field Studies: Environmental Education	4
NASC 5620** Field Ecology	5
NASC 5650 Place-based Learning	3
Graduate level Research Class	3
+ 9 additional credits for a total of 30 + a Plan B non-thesis	

- b. Distance delivery of programs/major
- i. The MMA program is designed to serve the work schedule of teachers and enable them to complete the course work in two years. Six credits are offered in Laramie for 3 weeks in June each summer and a 3-credit synchronous course is offered online each fall and spring usually on Tuesday evenings.
 - ii. The MSC program requires more hands-on experiences and coursework is designed to be completed in three summers (4 weeks, on campus in June). Electives may be taken online.
 - iii. The NED program is offered in conjunction with the Teton Science Schools in Jackson. Students are admitted as UW students, take classes and work in field science education in the graduate program in year 1 in Jackson (classes are taught through the Outreach School by adjunct faculty and transcript credits issued by UW). Those students who choose

(and meet requirements) may come to UW on campus for the second year of the program to complete their master's degree.

Most students complete their coursework, electives and Plan B projects within the established cohort program, but some find it challenging to finish their Plan B when they are working fulltime. The SMTC Outreach Educator created a 4-credit course offered each fall to provide the structure and skills to SMTC graduate students to design and complete their Plan B projects. It is an online synchronous course through Outreach although some participants who live in the area choose to attend in person. Two intensive weekends conducted face-to-face enable students to form a professional learning community in which they plan, share, provide feedback and mentor each other establishing relationships across the state and across programs.

Completion rates have increased dramatically since this course was implemented.

Describe the role of the program within the context of the college and the mission of the University:

In addition to serving STEM teachers by offering master's degree programs designed to fit their work schedules, SMTC engages in outreach efforts by providing professional development to Wyoming primarily through grant-funded outreach in collaboration with UW faculty. SMTC also puts on the Wyoming State Science Fair which brings more than 300 students and many teachers to campus each March. The event links teachers and students from throughout the West -- UW faculty too!

The SMTC plays a distinct role at UW as a long-term unit committed to interdisciplinary collaborations that support the teaching and learning of science and mathematics, and more recently engineering, technology and the arts. Supported by both the Colleges of Education and Arts and Science, the SMTC plays a leadership role in providing high quality, timely professional development that is research-based and culturally relevant to teachers in Wyoming and across the western United States. That means that the SMTC does not engage in one-shot workshops but works to provide professional development and ongoing follow up support increasing the likelihood of successful implementation. SMTC is both a resource center for educators and a center for developing projects and grant proposals to fund collaborations between K-12 schools, the Wyoming Department of Education, community colleges and University of Wyoming faculty. The SMTC offers master's degree programs to experienced teachers; facilitates collaborations on campus and around the state with organizations such as the WY After School Alliance, the Wyoming Environmental Education Association, and the Teton Science Schools. The SMTC is a national leader in place-based education, culturally relevant pedagogy, and increasing diversity in mathematics education.

The SMTC jointly sponsors and/or participate in planning and conducting events such as the SciArt Symposium this week with the Art Museum, Biodiversity Institute, the Haub School, and the Visual Arts Department; the Saturday STEM Days and Women in Science with WY STEM and the NASA Space grant. It sponsors speakers and invite the

entire campus and local educators (a good example is Chris Emden, a well-known science educator at Columbia University who uses hip hop to get kids to love science). The faculty sits on boards and committees such as the NASA Space Grant Advisory Board, the Biodiversity Institute’s Faculty Advisory Committee, the Committee on Women and People of Color, the Haub School’s Innovation Grants selection committee. It is actively involved with WY STEM, the Engineering Initiative and SER.

Financial data relevant to the academic program:

Ratio of student credit hours per FTE

The total program FTE is based on the assigned teaching load for the 3 SMTC faculty (Leonard: 25%; Houseal: 40%; and Parker: 30%).

	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	Total
Grad	589	844	713	877	698	751	4472
PD 5959 ^b	553	495	429	311	360	433	2581
Total	1142	1339	1142	1188	1058	1184	7053
FTE	.95	.95	.95	.95	.95	.95	
Credit Hrs/FTE	1202	1409	1202	1114	1114	1246	Average 1214.5

Direct instructional expenditures:

- i. The state support budget does not include faculty pay; expenditures are not tracked to specific programs or individuals. SMTC faculty typically teach NASC courses on- load and receive no extra pay. Faculty from other departments who teach courses for SMTC students particularly during the summer are paid as instructors. This table shows the income as well as summer school and course fee inputs.

Year	State support budget*	Summer School & Course Fees	Summer Salaries Faculty Teaching
2010	\$11,403	\$29,472	\$21,224
2011	\$10,833	30,530	12,611
2012	\$11,403	25,594	14,123
2013	\$15,000	No distribution	17,639
2014	\$15,168	29,818	9,750
2015	\$14,423	14,149	11,100

*Does not include \$75,000 provided for WSSF Coordinator and fair or for faculty and support staff

Course enrollment

- i. Because the MMA and MSC programs each include 24 credits of mandatory courses that are offered on a rotating basis, it is our

responsibility to offer the courses even if there is low enrollment so students don't have to wait 2 or 3 years until those particular classes are offered again. The only courses that appear to be under-enrolled are NASC 5959 professional development workshops – some participants might sign up for PTSB credit or none at all. All classes required for the degrees appear to have adequate enrollment numbers.

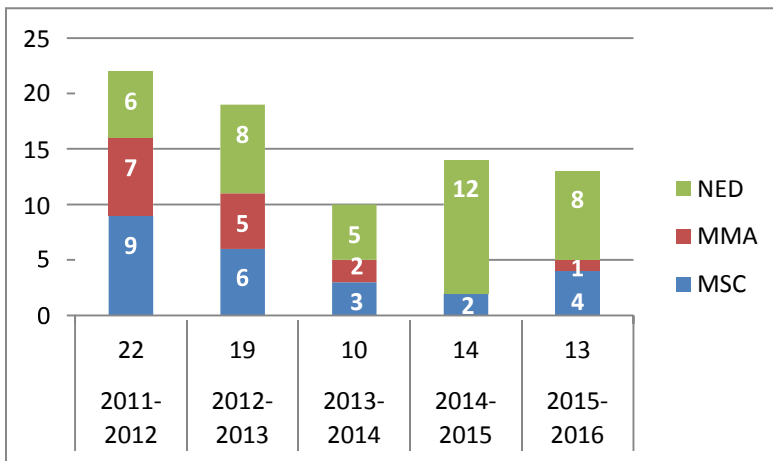
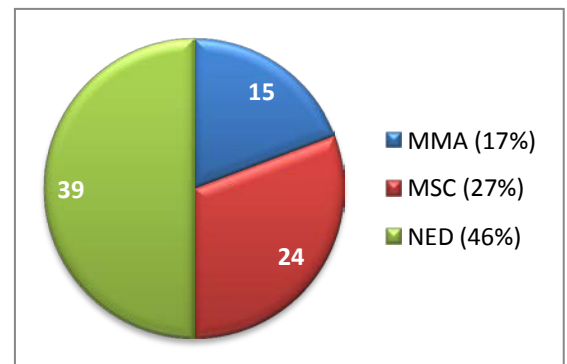
Admission, enrollment and graduation data relevant to the program, including the number of students currently enrolled and the status of their progress toward graduation:

Program Productivity/Demand:

a. 78 graduates over 5-year period³ (2011-2016):

- Middle-level Science Teaching (24)
- Middle-level Mathematics Teaching (15)
- Natural Science Education (39)

This chart represents the percentage of graduates from each program out of our total of 78 graduates. 46% (n=39) were from the NED program with Teton Science Schools, indicating this partnership has yielded excellent results.



This graph on the left shows the number of students who graduated from the three SMTC graduate programs each year over the past 5 years. On average, 16 students were graduated per year over this time period.

- b. Enrollment in MS in Natural Science concentrations over the 5-year period averaged:
- Middle level Science Teaching (14/yr)
 - Middle level Mathematics Teaching (11/yr)
 - Natural Science Education (9/yr)

An informal survey of graduates of the NED program showed that all but 4 of the 39 graduates are gainfully employed in areas related to their degree. All of the students in the MSC and MMA programs are employed teachers so few of them change jobs although some take on leadership roles within their districts.

Describe the administration of the program:

Functioning as a hybrid department within and across the College of Education and the College of Arts and Sciences, the SMTC facilitates collaborative interdisciplinary professional development projects that support teachers in Wyoming and across the western cultural and geographic region of the United States of America.

The Director position is vacant.

Describe the faculty and academic professionals who serve in the program, including their academic credentials, academic rank and length of service to the University:

Faculty. The SMTC has only two tenured or tenure track faculty and one Senior APL (extended term). The coordinator of the Wyoming State Science Fair (WSSF) is in a Temporary Assistant Lecturer position.

- Ana Houseal, PhD, Secondary & Continuing Education – Science Education, Assistant Professor, Appointed 2004
 - Sylvia Parker, MA, Technology in Education, Senior Academic Professional Lecturer, Appointed 2004
 - Erin Stoesz, MS, Geology and Celtic Studies, Coordinator of Wyoming State Science Fair, Appointed 2015
- i. 93 Affiliate Faculty members in the Colleges of Agriculture (5), A&S (37), Education (21), Engineering (5), Other UW (7), Community Colleges (3), and Emeritus (15). Affiliates assist with reviewing applications, teaching classes, mentoring students, serving on graduate committees, collaborating on grant-funded projects and providing professional development to teachers.
- ii. Grants awarded to academic personnel and/or managed by SMTC since 2010
- External grant funding: \$9,863,020
 - Internal UW awards: \$69,792
 - Contracts/Service Agreements: \$434,972
- iii. Publications/presentations by academic personnel 2011-2016
- Jacqueline Leonard, Professor: 13 Journals, 1 article, 5 chapters, 1 book;

- 36 presentations, 3 proceedings
- Ana Houseal, Assistant Professor: 5 Journals, 2 articles, 3 reports, 2 curricula; 32 presentations
- Sylvia Parker, Senior APL (extended term), 3 papers, 25 presentations

Describe the program facilities, including classrooms and offices, library and equipment used by or dedicated to the program:

SMTC program facilities include seven offices (WH 449, 453, 455, 457, 459, 454, 450), which are (were) occupied by three faculty members (including the director), office associate, accounting associate, Wyoming State Science Fair Coordinator, and work study student. Facilities also include a storage closet for materials and supplies, conference room (WH 445), copy and mailroom, kitchen, meeting space (WH 402) and classroom that is shared with ROTC. Equipment includes the use of a Promethean board in WH 445, computers, laptops, and LCD projectors (see attached file from our last audit).

Evaluations from accrediting bodies or other reviewers of the quality of the program and its faculty and academic professionals:

The SMTC programs are not ranked. Information about their reputation is largely anecdotal. Many teacher leaders in the state are graduates; graduates refer their friends and colleagues. Those who are in the program are fiercely loyal.

- The MMA and MSC programs prepared for the National Council for Accreditation of Teacher Education (NCATE) accreditation review that was conducted in the College of Education in 2015. However, that cycle of reviews was focused on undergraduate programs rather than graduate programs. The two SMTC programs were referred back for evaluation to the Wyoming Professional Teaching Standards Board (PTSB), the organization that had previously evaluated both programs and recognized them. The PTSB uses nearly identical criteria as NCATE. Paperwork was revised and submitted and the MMA was accredited during AY 2015-16; the MSC program has been submitted for accreditation this year (FA16).
- There is no specific accreditation for the NED program through NCATE.

Comparison of the program with related or similar programs:

The SMTC programs are unique at UW. The synergy between the academic programs, the outreach efforts, relationships with faculty and other UW interdisciplinary programs, and institutional support should not be underestimated.

Describe the anticipated effects of elimination of the program upon the college in which the program is situated, upon other colleges and units of the University, and upon the University as a whole, including:

Effects upon students enrolled in the academic program:

Minimal. The degree programs currently housed in the SMTC will be maintained by moving them to the most appropriately aligned university departments for future administration if the SMTC as an administrative unit is eliminated.

The College of Education will work with the College of Arts and Sciences to determine the appropriate locations for graduate degree programs currently housed in the SMTC in order to facilitate the degree progress of those students in these graduate degree programs.

Effects upon faculty and academic professionals who serve in the program, including termination of any existing positions:

Dr. Jackie Leonard, Former Director, has resigned as Director and returned to her tenured Full Professor line in the Department of Elementary and Early Childhood Education, Appointed 2012.

The following could lose their employment with the closure of the SMTC:

Ms. Sylvia Parker, Coordinator, Appointed 2004

Erin Stoesz, Wyoming State Science Fair Coordinator, Appointed 2015

Lindsey Galey, Office Associate, Appointed 2013

See implementation section below for the process if termination does occur.

Educational and financial effects upon other units of the University:

The Provost's office will examine the best organizational structure to support a coherent, cohesive university- and statewide support mechanism for recruiting and retaining STEM majors to UW, and to support the Science, Engineering, and Education Initiatives simultaneously. This will require a re-envisioned P-16 STEM support structure, but should have minimal financial or education effects. In fact, it will likely enhance both.

Effects upon faculty, academic professionals, staff, students and alumni of the University:

The efforts outlined above will provide enhanced benefits to all stakeholders.

Effects on the State of Wyoming, including loss of benefits conferred outside the University by the academic program:

The efforts outlined above will provide enhanced benefits to all stakeholders.

Implementation plan to be followed in the event the academic program is eliminated, including:

Procedures for handling current and future applications for admission:

Expected timeline to meet teach-out requirements established through the regional accrediting body.

The degree programs currently housed in the SMTC will be maintained by moving them to the most appropriately aligned university departments for future administration if the SMTC as an administrative unit is eliminated.

The College of Education will work with the College of Arts and Sciences to determine the appropriate locations for graduate degree programs currently housed in the SMTC in order to facilitate the degree progress of those students in these graduate degree programs.

Plans for assisting currently enrolled students to complete the course of study:

As above.

Plans for accommodating faculty and academic professionals who will be terminated or otherwise affected by elimination of the academic program:

Per UW Regulation 6-43, the University shall offer the tenured faculty member or extended term academic professional another appropriate position in the University if the person is qualified and the position is available before the date of the termination of the person's position. In the allocation of appropriate positions, positions shall first be offered to tenured faculty and extended term academic professionals who are being terminated before offers are made to probationary faculty and academic professionals or other persons not currently employed by the University.

If no appropriate University position is available for which the person is qualified, the University shall continue the position of the tenured faculty member or extended term academic professional for at least the next full academic year after the date of the termination of the person's position. The continued position may be assigned appropriate duties consistent with the best interests of the University.

The University shall offer the probationary faculty member or probationary academic professional another appropriate position in the University if the person is qualified and the position is available before the date of the termination of the person's position. In the allocation of appropriate positions in the University positions shall first be offered to probationary faculty and probationary academic professionals before offers are made to persons not currently employed by the University.

If no appropriate University position is available for which the person is qualified, the University shall continue the position of the probationary faculty member or probationary academic professional who is in at least the third year of service on the date of the termination of the person's position for at least the next full academic year after that date. However, for a probationary faculty member or probationary academic professional in the second year of service, the position shall be continued for at least six months. For a probationary faculty member or probationary academic professional in the first year of service, the position shall be continued for at least six months. The continued position may be assigned appropriate duties consistent with the best interests of the University.

A faculty member or academic professional who receives notice of termination because of elimination of an academic program shall have the right to appeal the termination under UW Regulation 5-35, Appendix B, but not the decision to eliminate the program, unless the decision is based in whole or in part on financial exigency under UW Regulation 6-41.

The Provost's Office will begin immediate exploration of how the work of the three current university initiatives, science, engineering and education, could be combined to support a University STEM P-16 Education Center to support seeking and obtaining broader impact grants and contracts in STEM disciplines and in the P-16 educational community.

The Wyoming State Science Fair coordinator and associated state funding should be shifted to a different organizational structure, which could be housed on the UW campus. The Provost's Office is charged with investigating optimal structure. This will likely move to the WYSTEM or re-envisioned STEM P-16 Education Center, or other affiliated entity at UW.