

Project Description
February 2007

I. An Introduction to Northland Pioneer College

A. A Unique Community College Serves a Diverse and Widely Dispersed Population

Northland Pioneer College (NPC) is a comprehensive, multi-campus community college. All students commute to four full-service campuses, six centers, and numerous educational outreach sites serving Navajo and Apache Counties, an area of 21,158 square miles in rural and remote Northeastern Arizona. Approximately the size of West Virginia, the region has a population density of fewer than 8 persons per square mile. For perspective, there are 45.2 persons per square mile in the State of Arizona and 333.8 persons per square mile in Maricopa County, where the capital city of Phoenix is located.¹ The tribal lands of the Navajo, Hopi and White Mountain Apache (Fort Apache Reservation) people comprise 60% of the NPC service area. Over 62% of the population of the two counties is Native American, compared to 5% for Arizona and 1.8% for Maricopa County.² While 13.9% of all Arizonans live below the poverty level, 29.5% of Navajo County residents and 37.8% of Apache County residents have this distinction.³ In addition to being the two poorest counties in Arizona, Navajo and Apache Counties rank in the poorest 2% of all counties in the United States.⁴

B. An NPC Student Profile – Retention and Completion are Significant Issues

NPC students encounter many barriers to post-secondary education, most related to socio-economic status, making them extremely at-risk for attrition. According to the NPC Office of Institutional Research and Planning, (IRP) over 70% of NPC students are the first in their families to attend college. Fewer than 19% are degree-seeking, and according to the Fall 2006 enrollment report, only 19.0% are full time, taking 12 or more credit hours. The average student takes 6.4 credits per semester. Per the NPC Financial Aid department, in 2005-2006, 48.9% of students who applied qualified for assistance, however this figure does not capture the number who do not apply, because they do not understand the process or because they are unaware of what is available. Despite comprising 62% of the population of NPC's service area, Native American students represent less than 30% of the college's total enrollment. While the White Mountain Apache Tribe has an active scholarship program, Navajo and Hopi tribal scholarships are on the decline due to financial constraints within the two tribes whose economies are not supported by gaming. Moreover, the Navajo Nation lost one of its largest sources of revenue when Peabody Coal Company shut down its Black Mesa Mine and Power Plant in 2005.

In a 2000 NPC survey of reasons for attrition, 40.1% of the 150 respondents indicated that job-related conflicts and financial difficulties affected their decision to drop out. It should be noted that this survey did not capture those students who encountered barriers and simply stopped attending classes. An institutional study that followed 154 *full-time, first-time students* at NPC from Fall 2000 through Summer 2004 reveals that of this number, only 11 students (7.14%) had completed a degree or certificate program by Fall 2003. By Summer 2004, 15 had graduated (9.74%). Retention averaged approximately 56% from year to year, and by Summer 2004, all of

¹ www.workforce.az.gov/admin/uploadedPublications/421_pop_density.xls

² www.workforce.az.gov/admin/uploadedPublications/418_pop_ethnic2000.xls

³ www.workforce.az.gov/admin/uploadedPublications/487_PovAllCoPLa00.xls

⁴ www.bea.gov/regional/reis/drill.cfm

the original 154 full-time, first-time students had either graduated (9.74%) or dropped out (90.26%).

Fall 2000 NPC Full-time, First-time Student Retention and Graduation by Semester

	Fall 2000	Spring 2001	Fall 2001	Spring 2002	Summer 2002	Spring 2003	Summer 2003	Fall 2003	Summer 2004
Grads		0	1	3	3	1	3	0	4
Retained	154	122	88	72	49	42	29	15	0

For students who *can* complete educational programs, some of the most lucrative employment opportunities in the area are tied to S-STEM disciplines. Navajo and Apache Counties are home to three coal-fired power plants with a combined total of 600 employees who are “aging out” of the workforce at a critical rate. Other S-STEM employers include Navapache Electric Cooperative, which provides power to customers over 10,000 square miles in eastern Arizona and Western New Mexico and Abitibi Consolidated, a paper products recycler. In an area known for great natural beauty and outdoor recreation, careers in the natural sciences are available for *qualified* individuals. Employers include the National Park Service, the U.S. Forest Service, state and tribal game and fish departments, the U.S. Fish and Wildlife Service, the U.S. Department of the Interior, and the Bureau of Land Management. Moreover, K-12 schools desperately need teachers in the disciplines of science and mathematics, not only in northeastern Arizona, but nationwide.

These factors precipitate the need for a *comprehensive* plan to encourage and support learners in their pursuit of post-secondary education in the disciplines of Science, Technology, Engineering and Mathematics. The project described in this proposal *will* succeed in increasing the number of students who complete degrees in the S-STEM disciplines, in spite of the barriers they encounter. It will do so, not only because students are selected based on academic talent, but also because it addresses the financial, academic, and personal needs of each participant *individually*. It also makes each S-STEM scholar part of a supportive cohort, and through partnerships with area employers, involves each student in the *application* of his or her discipline area. The result is a *seamless pathway from K-12 education, to university, to career via the community college experience*. Collectively, the whole-college commitment to the project, and letters of commitment from educational and workplace partners across an area of over 21,000 square miles are a resounding testament to the need for this project, and evidence of overwhelming endorsement for it.

II. Goals and Objectives

NPC proposes to provide scholarships and support services to *recruit retain and graduate* not less than 34 academically talented but financially needy students over a four-year period who wish to pursue education/careers in Science, Technology, Engineering and Mathematics. Emphasis will be placed on recruiting and retaining students from populations that are under represented in these fields, *especially* Native American students. The project will be managed by Principal Investigator (PI), Dr. Patrick E. Canary, NPC Faculty in Biology and Chemistry. He will be assisted by Co-Principal Investigator (Co-PI) Randy Porch, NPC Faculty in Geology. Canary and Porch each will facilitate two cohorts, with each cohort consisting of 12 S-STEM scholars, for a total of 48 scholars over a four-year period. **It is the goal of the project that not less than 70% of each cohort receive an associate degree within 3 years, and transfer to a**

university to pursue a baccalaureate in one of the S-STEM disciplines, or become employed in one of the S-STEM disciplines. It is also a project goal that not less than 50% of each cohort will be scholars from under-represented groups. The cohort size of 12 scholars was determined by Canary and Porch, based on the average number of NPC students whose degree plans indicate a S-STEM track (less than 10%), and the maximum number of students Canary and Vest felt they could recruit and adequately support with individualized program services. Mark Vest, NPC Vice President for Student Services will serve a key project role, facilitating the working partnership between NPC faculty and student services staff that will support project participants. Strategies to accomplish project goals are introduced below and described in detail in the Plan of Operation that follows. Strategies include:

- **Early recruitment** of potential S-STEM scholars, beginning at the ninth grade level, and including intensive, direct recruitment of Native American students, will generate excitement about S-STEM careers and make planning for careers through college a reality;
- **S-STEM Career Fairs**, targeting high school students across the service area, but also open to students of non-traditional age will showcase careers and education in the S-STEM disciplines and disseminate project information and application materials;
- **Supportive cohorts** for all S-STEM scholars will promote retention and provide a means for key project personnel to quickly intervene and support students who are struggling;
- **Job shadowing** for all scholars in their S-STEM discipline areas will advance construction of a framework of knowledge connecting the classroom, the completion of a degree and the workplace, and enable students to better understand their chosen field while still early in their educational programs;
- **Professional mentors** representing the S-STEM professions will be assigned to each S-STEM scholar, further reinforcing the degree-to-career connection;
- **Peer mentoring** will enable second-year students to mentor first-years through the seminar class, strengthening students' bonds to one another and to their educational program;
- **Internships** with employers in the S-STEM professions they have selected will assist students in building a bridge from degree to career;
- **University field trips** will enable NPC students to identify support structures at their university of choice *before* matriculating, promoting completion and matriculation and reducing attrition at the baccalaureate level.

III. Project Management: The Plan of Operation

A. Recruitment: Broadening the Participation of Under-represented Groups

Project Year One will allow the PIs to work with Vice President Vest's staff to establish and operationalize the S-STEM project, informing the community and recruiting the first two cohorts. **High school science and math teachers across the service area are committed to promote the project** to graduating seniors, who may become S-STEM scholars in Project Year Two, and upcoming underclass who can join in subsequent years. Emphasis will be placed on encouraging potential scholars from the Navajo, Hopi and Apache reservation high schools through direct marketing and recruitment. Canary and Porch, assisted by Vest will also fully develop the seminar class, identify guest speakers, job shadowing positions, and internship opportunities, and establish a team of S-STEM tutors from the ranks of high school and college faculty and professionals from S-STEM disciplines. They will also develop and implement the **S-STEM career fairs for recruitment**. They will specifically target Native American tutors, professional mentors and guest speakers for all aspects of the project.

Applications for participation in the project will be taken up to four months prior to the start of the Fall 2008 semester. All applicants will be required to provide a FAFSA report to establish financial need and identify *all* resources available to them, such as Federal PELL grants and other scholarships. S-STEM scholars will be selected based on the application, which will include evidence of financial need based on the FAFSA, academic talent based on high school, and if applicable college GPA, and no fewer than three letters of recommendation from teachers, counselors, and/or professionals in the student's selected discipline. Students will also submit a 500-word essay describing their future goals and aspirations as they relate to the S-STEM discipline they have chosen. Applicants will be selected by a committee consisting of the PI, the Co-PI, an additional NPC S-STEM Faculty representative, and a representative from Student Services. Scholarship amounts will be allocated based on each student's unmet need as determined by the NPC Financial Aid office, with a maximum of \$4,000 per student per academic year. If more than 24 applications per year are viable, a waiting list will be generated and as vacancies arise, students will be accepted in the chronological order in which their applications were received by NPC. If an S-STEM scholar voluntarily exits the program or becomes ineligible, his or her position may be filled by the first applicant on the waiting list. Scholars will be required to maintain full-time status, and participate in all project activities including the seminar class, job shadowing, peer and professional mentoring, internships, and university field trips. They must maintain a GPA of not less than 2.5. Students in danger of falling below the 2.5 GPA will be closely monitored by their cohort facilitator who will make every effort to assist them in raising grades through provision of supportive services based on individual needs.

Within three weeks of being accepted, each S-STEM scholar will meet with an NPC Academic Advisor to develop a degree plan for the Associate of Science. The General Education component of the NPC **Associate of Science** Degree fulfills the Arizona General Education Curriculum (AGEC-S). This is important because the AGECS, when completed, will transfer to the three public Arizona state universities as a block meeting all lower division general education requirements. Each student will identify his or her chosen S-STEM discipline when developing the degree plan, and select those courses, especially with regard to electives, that will most effectively advance knowledge and understanding of the chosen S-STEM discipline.

B. Retention: Enhancing the Infrastructure for Education through Partnerships

Partnerships will be a key element of the project: among S-STEM scholars; between NPC faculty and student services staff; area high schools and NPC; and area S-STEM professionals, project staff and scholars. These partnerships will promote retention, give S-STEM scholars a tangible link between the classroom and the professional arena, enhance ties between high school and college science and math faculty, and encourage project sustainability.

To promote belonging and support among the S-STEM scholars, many from groups under-represented in post-secondary education and the S-STEM disciplines, two cohorts, each consisting of twelve S-STEM scholars will be established in Year Two, and two in Year Three. One, the **Little Colorado cohort**, will be based at the Little Colorado Campus in Winslow, Arizona. This campus is located along the Interstate 40 corridor, and is the largest full-service campus serving the *northern* portion of the NPC service area. It is immediately adjacent to the

tribal lands of the Navajo and Hopi People and the most accessible full-service campus for students commuting from both tribes. Most importantly, it is the home of the Blunk Science Center, which houses state-of-the-art laboratories for the study of biology, chemistry, geology, and the health sciences. The White Mountain Campus serves the southern portion of the NPC service area, and is the most accessible full-service campus to students from the White Mountain Apache Tribe. It will house the **White Mountain cohort**. Its Ponderosa Center, like the Little Colorado's Blunk Science Center, houses comprehensive biology, chemistry, and geology labs.

Part of each S-STEM scholar's degree requirements will be the aforementioned one-credit seminar class. PI Canary will serve as head of the Little Colorado cohort and facilitate their seminar class, and Co-PI Porch will serve in this role for the White Mountain cohort. Guest speakers from S-STEM professional disciplines will share experience through their classroom presentations as well as serving as **professional mentors** to S-STEM scholars. NPC Student Services staff will present on topics such as **college success skills, career exploration, and university matriculation**. The Coordinator for Academic Advising will cover on-line student services technology, an increasingly important subject as institutions become more reliant upon digital resources to meet student needs. The Coordinator for Career Services will keep a file on each S-STEM scholar to assist him or her with employment upon graduation from either NPC or a baccalaureate-granting institution. All work-based experiences will be documented in the file, which will help scholars to build a resume. NPC faculty members from S-STEM disciplines will share their perspectives with scholars regarding what makes a student successful and how the student can optimize the college experience. The Coordinator for Disability Resources will assure that all S-STEM participants are accommodated with regard to native language or disability status. She will also facilitate any accommodations necessary to ensure a smooth transition into university education for any participant who self-identifies as having a disability, and will see that these individuals continue to receive support after matriculating.

Additionally, the seminar class will provide a means for all scholars in the cohort to come together on a regular basis, in spite of the geographical distances between them, and for project faculty and staff to identify struggling students and intervene with appropriate support services, such as **tutoring**. S-STEM tutors will *not* come from the NPC tutorial pool, comprised of NPC students. Rather, tutors will be identified from the ranks of NPC S-STEM faculty and local high school science and math faculty, as well as from professionals in S-STEM disciplines. Employing these individuals as tutors will provide a higher caliber of academic assistance, while helping scholars understand *application* of college subjects to the S-STEM disciplines, strengthening their connections between education and profession. The seminar class will also provide a springboard for entry into **job shadowing, professional mentoring, and internship experiences** for *every* S-STEM participant, as well as **university field trips** to the campuses of each of the three state universities.

Each S-STEM scholar will be required to job shadow in his or her selected S-STEM discipline. Scholars will be paired with workplace professionals to complete a portfolio of exercises facilitating their deeper understanding of the application of the discipline, and promoting a realistic idea of what the workplace is like. Realistically, some students will discover through these experiences that they had misconceptions about their chosen S-STEM fields. This as an opportunity to redirect them before they are deeply entrenched in their plans. For this reason,

job shadowing comes early on in the scholar's post-secondary experience. Scholars will be assisted in exploring other S-STEM opportunities, or in some cases, abandoning the S-STEM path altogether. If the latter occurs, while no longer be eligible for S-STEM support, the students will be assisted with tuition and fees for the remainder of their two-year scholarship window through a combination of institutional and non-institutional financial aid opportunities to encourage them to complete an associate degree.

Third-semester S-STEM Scholars will serve as peer mentors to first-semester scholars. Whenever possible, mentors and mentees will be pursuing the same S-STEM area. This *peer* mentoring will establish a symbiotic relationship: mentees benefit from the experiences of their mentors while the mentoring aspect strengthens the knowledge framework of the mentor and promotes mastery, not only of subject, but also of the learning process. PIs will be able to monitor the peer mentoring process through review of journals kept by mentor and mentee recording their interactions, which will take place not less than every other week.

Through internships in the fourth semester, for which they will receive credit toward their degrees, S-STEM Scholars will have a meaningful basis for applying lessons they have learned in the classroom. They will demonstrate knowledge and skills in the S-STEM workplace of their choosing, paired with a professional mentor who assists them in developing a set of *individualized competencies*. As the scholar works toward demonstration of mastery of the competencies, the professional mentor will provide guidance and oversight. Scholars will record information about their experiences and supply evidence of mastery through a journal, which will be the basis for their grade on the internship experience. Additionally, the NPC Career Placement Coordinator will include documentation of workplace experiences in the student's career placement file, assisting with future resume building.

In the third and fourth semesters, all scholars will take field trips to the University of Arizona in Tucson, Northern Arizona University in Flagstaff, and Arizona State University in Tempe. While enhancing their understanding of the university matriculation process, these field trips serve an even greater purpose with regard to the uniqueness of NPC students. The student body of each Arizona university is *many* times larger than the population of even the largest town in the NPC service area. Experience has shown that often, students from small, rural communities, especially Native American students from reservation communities, drop out of university programs because they are unprepared to handle the "culture shock" of being immersed in such a large, impersonal setting. University field trips will direct students to student support groups, tutoring, health care, Native American and other minority student clubs and even *science, mathematics, engineering and technology organizations* where they can be supported by the institution before they are actually enrolled there.

Perhaps most important for retention is the application of timely, appropriate intervention when students struggle. S-STEM scholars will be monitored closely through the medium of the first-year seminar class, mentorship experiences, lab aide work and internships. PIs and other faculty will direct these scholars to academic advisors who can quickly arrange for tutorial, career, disability resources assistance, etc. There is an NPC academic advisor at every campus and center location – two at the White Mountain Campus – to facilitate student support services. Scholars will be required to meet not less than quarterly with their assigned advisors to review

progress on their degree plans and related requirements. In the event that a S-STEM scholar wishes to change plans or programs, advisors will provide prompt assistance to minimize loss of credits.

It is important to note that while all students in a cohort will attend the seminar class and participate in university field trips as a group, individuals will progress through their degree plans at their own pace. While all must be enrolled full-time, some will opt for summer school, and some may take overload classes, while others may require extra time to complete or repeat course work. In the experience of Canary and Porch, the most capable scholars may still take up to six semesters to complete a degree plan. For this reason, S-STEM scholarships will follow each student for up to three years, enabling students to pace themselves according to their own situations and learning styles.

Individualized degree plans, supportive cohorts, the first-year seminar class, job shadowing experiences, lab aide and internship experiences, peer and professional mentoring and university field trips will provide a solid structure to promote retention, and ultimate success of S-STEM scholars. This is realized through partnerships between community college faculty and staff, and between the college its feeder high schools, and S-STEM employers. Together, they provide the infrastructure for education that is meaningful, applicable, and seamless.

C. Completion: Collateral Benefits to Northeastern Arizona

All employers in the area Power Generation and Supply industry are experiencing rapid growth and concomitant growing pains, and all face the challenge of advancing their workforces in an increasingly technological industry, while preparing to replace a large percentage of retirees. Together, they provide nearly 600 jobs in Navajo and Apache Counties. Given the low socioeconomic status of the area, this is significant, because theirs is among the highest-wage industries. Lucrative careers in the natural sciences are available through the National Park Service, the U.S. Forest Service, state and tribal game and fish departments, and the U.S. Fish and Wildlife Service. School districts desperately need science and math teachers. In partnering with NPC to provide job shadowing, professional mentoring and internships for S-STEM scholars, these employers are growing their own field of S-STEM professionals. Relationships built during the project translate into workplace opportunities for graduating S-STEM scholars from all levels of education, from associate to post-baccalaureate. As scholars complete their AS degrees at NPC, they will either matriculate to the university level, or in some cases, enter employment in an S-STEM field. Through their S-STEM project experiences, these scholars will build relationships with employers who desperately need competent, well-educated individuals to fill positions in science, mathematics, technology and engineering.

Letters of commitment for the project have been received from every high school in the service area and from over 20 workplace partners. All have described a level of commitment that includes assisting with recruitment, providing job shadowing and internship experiences, and participating in professional mentoring. Because of the sheer volume of printed material, the letters have not been submitted via the FastLane system, but all are on file with the Vice President for Student Services, and can be produced to the funder immediately upon request.

D. Institutional Effectiveness

Northland Pioneer College is well-qualified to implement the S-STEM project and ensure its success. In spite of the high attrition rate for NPC students described on page 1, NPC academic programs have proven very successful for transfer students. The most recent data reveals that 22 of 25 students (88%) who completed associate degrees at NPC and transferred to Arizona State University West graduated in 2005 and 2006 *with honors*. The 2006-2007 All-Academic team from NPC has seven members, the highest of any community college in the state. Moreover, the NPC S-STEM project builds upon an ongoing collaboration between the college and many partners in business and industry. Attesting to this, an advisory committee from the Power Generation and Supply industry assisted in the development and design of a new degree program for Power Plant Fundamentals. The NPC Heritage Preservation program was developed through a collaboration between NPC faculty in History and Archaeology and representatives from the National Park Service. It emphasizes the preservation of environmental and cultural resources. Many other business and industry partners have assisted in course and curriculum development, and provided opportunities for college students. The college also administered a nationally-recognized School to Work program that included over 400 partners from business and industry. These partners provided opportunities including job shadowing, professional mentoring and internships, all of which are key elements of the S-STEM project. NPC has also managed and administered many large, multi-year, grant-funded projects. Funders have included the Fund for the Improvement of Post-Secondary Education (FIPSE), Title III Strengthening Institutions, and the Arizona Department of Commerce.

E. Quality of Key Personnel

Principal Investigator Dr. Pat Canary offers a diverse body of experiences applicable to the improvement of Science, Mathematics, Engineering, and Technology education at NPC. His earliest experiences with this type of training occurred during his graduate training at West Virginia University where he was involved in two summers for an NSF-SSTP program. He taught laboratory sections that were implemented as a special program of laboratory and field trips, provided instruction at the Terra Alta Field Biology Station and evaluated the research performed by the students. Non-academically, Dr. Canary worked as a synthetic organic chemist and as a research biochemist in Cleveland Ohio, and worked as a plant chemist at the Fort Martin Power Plant for a number of years before returning to academia. At the power plant he worked extensively with engineers and technicians as well as the power plant operational personnel. These non-academic experiences will serve him well in relating to the workplace partners affiliated with the project. His academic qualifications include administrative as well as teaching experiences. He has served as Chairperson for the Science/Math/Technologies Division as well as the Director of Institutional Research at West Virginia Northern Community College before returning to a full time teaching position.

Dr. Canary will receive a reduction in load of one course per semester to manage the project and serve as Little Colorado Cohort Facilitator. In addition, he will maintain confidential records for every S-STEM scholar, whether from his own Little Colorado cohort or from the White Mountain Cohort. Canary will utilize these records to assist him with project evaluation and reporting activities, and to assure student needs are being met. For services, he will receive a stipend of \$2,000.00 per semester from administrative grant funds. Co-PI Randy Porch will assist

with project management and receive a reduction in load of one course per year to serve as White Mountain Cohort Facilitator. He will maintain records for his own cohort, but will forward complete copies of all records to Dr. Canary to facilitate efficient records management. He will receive a stipend of \$1,000.00 per semester from administrative grant funds. Mark Vest, NPC Vice President for Student Services will also serve in a key position, providing oversight of the recruitment, marketing, financial aid, academic advising, tutoring and other supportive elements of the project, all of which are under the umbrella of his division.

Randy Porch has held the position of NPC Faculty in Geology for almost twelve years. He brings to the project the most comprehensive understanding of the NPC service area and the unique cultural aspects and learning styles of its students of any of the three key personnel. Especially relevant to the project, he has for the past ten years participated in the development of courses and also served as a facilitator for staff development. His perspective on teaching Native American students at NPC is enhanced by the three years he spent as a summer tutor in math and science for the Nizhoni Academy, a pre-college program designed to encourage Native American students to seriously prepare for scholastic achievement in secondary and post-secondary education. The Academy, based at Northern Arizona University in Flagstaff, emphasizes a rigorous academic discipline to provide students a clear understanding of the demands of college studies and the requirements of academic study skills necessary to be successful in college. These elements have a great deal in common with the NPC S-STEM program, and Randy will be an excellent resource in designing and facilitating the seminar class. He organizes and leads annual Geology field trips, which have included northern Mexico, the Grand Canyon area and Southern Utah for NPC, and can lend his skills in this capacity to optimize student outcomes from the university field trips. Randy is extremely well-liked by the students he teaches, and he is highly respected by his peers.

Because the success of this project is based upon the identification and recruitment of a select group of scholars, and a strong working partnership between faculty and student services staff, the project is fortunate to have Mark Vest, NPC Vice President of Student Services, providing oversight. Not only is his excellence as an educational administrator well documented, but he has worked in the ranks of student services. Most notably, as Admissions Counselor/Recruiter at the University of Kentucky, he organized and led university “recruiting fairs” throughout western Kentucky. As one of five admissions counselors, he recruited 40% of the academic scholarship students in 1989-1990. These accomplishments speak to his ability to organize the S-STEM Career Fairs described on page 4, to manage the applications and selection process, and to administer appropriate interventions for students in need. His leadership roles on NPC instructional, assessment, and strategic planning committees as well as his role in directing the preparation of the NPC 2005-2006 institutional enrollment management evaluation and report will make him a valuable asset when evaluating the S-STEM project and prescribing modifications for its ongoing betterment.

F. Dissemination of Results to Advance Lessons Learned

PI Dr. Pat Canary and Co-PI Randy Porch annually participate in discipline specific articulation task force meetings to promote transfer of credits from Arizona community colleges to universities. These events provide a natural platform to reinforce bridges over which S-STEM scholars move from community college to university and provide an arena for sharing S-STEM

project information. Specifically, Canary represents NPC on the Biology task force and Porch on the Geology task force. Because these groups consist of science educators from community colleges and universities throughout Arizona, other participants may use Canary and Porch's information to design their own S-STEM projects. In Year One, Canary and Porch, assisted by Vice President Vest will design a web page, linked to the NPC home page, through which other institutions may glean information about the project. At the close of each project year, PI Canary will post formative evaluation reports and anecdotal advice to guide others who wish to develop similar projects. Additionally, as the project proves successful in promoting retention and degree completion, the college will have a strong base to justify funding through future grants from a variety of sources.

G. Sustainability

The reader will note that some strategies in Years Four and Five are dependent upon further funding. If this project proves to be successful, based on formative and summative evaluations, NPC will endeavor to sustain it. If funding for future years is not available through the National Science Foundation, the college will pursue alternative sources, such as corporations and private foundations.

H. Evaluation

Ongoing evaluation will provide a means for continual refinement and improvement of the project. To assure this, Canary, Porch and Vest will meet quarterly throughout the project cycle to examine 1) evidence of progress as related to the strategies identified in the Project Management charts on pages 11-15; 2) numbers of participants served and the services each received; 3) participant satisfaction with program services. To provide data for the latter, a questionnaire will be developed by Canary, Porch and Vest to be completed by each project participant at the end of each year, and as he or she exits the program. This instrument will reveal what elements were most effective for students, and provide a basis for refinement or revision of strategies.

Dr. Canary, assisted by Porch and Vest, will prepare a summative evaluation report at the close of the project, addressing all data elements described previously. A synopsis of all data collected, all formative evaluation reports, and information on any modifications that were made to the project will be included in the this report. It will culminate with an analysis of the overall project goal: did at least 70% of NPC S-STEM scholars enroll in a university S-STEM program or become employed in a S-STEM discipline? Was each cohort comprised of at least 50% of scholars from under-represented groups? What lessons were learned to assist other institutions in recruiting and retaining learners in the S-STEM arena?

The Project Management charts that follow provide a comprehensive means of directing, administering and overseeing a critically important project for the Northland Pioneer College Service area. It is a project that *will* succeed in retention of not less than 34 Associate of Science candidates who will receive their degrees over the next five years. But it is not a project to serve S-STEM scholars alone. Navajo and Apache Counties will benefit for many years to come – economically, socially, and intellectually – from the knowledge and expertise of these future scientists, technological professionals, engineers and mathematicians.

Project Year One: 9/1/07 – 8/31/08

Strategies	Responsible Person	Completion Date	Outcome Measures
1. Development and implementation of a marketing plan to inform the public of project opportunities.	Mark Vest, NPC VP for Student Services with Director of Marketing	10/01/07	Marketing plan implemented; interested parties making contact with NPC Student Services.
2. Development and implementation of a recruitment plan to be carried out through area jr high/high school science/math faculty.	Mark Vest, NPC VP for Student Services with Director of Marketing	10/01/07	Recruitment plan implemented; interested parties making contact with NPC Student Services.
3. Applications for S-STEM Scholars accepted by NPC Student Services.	Mark Vest	10/01/07	Not less than 30 applications received by 05/01/08.
4. Development and implementation of an evaluation plan and schedule for continual project refinement and improvement.	Dr. Pat Canary, PI, with Randy Porch, Co-PI and Mark Vest	Ongoing quarterly	Quarterly evaluation reports on file with PI, cc to Co-PIs and college administration.
5. Coordination of an S-STEM Career Fair for all high school students in the service area; open to non-traditional students also.	Mark Vest	05/01/08	S-STEM Career Fair takes place; interested parties contact NPC Student Services.
6. Development of a course description and outline for the S-STEM seminar class.	Dr. Pat Canary, PI and Randy Porch, Co-PI	05/31/08	Course accepted by NPC curriculum committee.
7. Identification guest speakers and instructors and schedule for seminar class.	Dr. Pat Canary, PI and Randy Porch, Co-PI	05/31/08	List of guest speakers / instructors / schedule developed.
8. Identification of project partners to provide job shadowing / professional mentoring / internship opportunities in S-STEM professions throughout the service area.	Dr. Pat Canary, PI and Randy Porch, Co-PI	05/31/08	Database of project partners and contact information; shadowing / mentoring / internship opportunities established.
9. Establishment of a pool of not less than 4 professional S-STEM tutors at each cohort location.	Mark Vest	05/31/08	List of tutors and their contact information developed.
10. Application committee reviews applications and selects scholars.	Dr. Pat Canary, PI; Randy Porch, Co-PI; Mark Vest	06/30/08	Not less than 24 S-STEM Scholars accepted for Project Year Two.

Project Year Two: 09/01/08-08/31/09

Strategies	Responsible Person	Completion Date	Outcome Measures
1. S-STEM Scholars meet with their advisors to develop degree plans.	Mark Vest	08/01/08	Each S-STEM Scholar has a degree plan for AAS on file with a S-STEM discipline identified.
2. Marketing & recruitment plans reviewed and refined to optimize project participation.	Mark Vest, NPC VP for Student Services with Director of Marketing	08/01/08	Marketing continues; interested parties making contact with NPC Student Services.
3. Applications for S-STEM Scholars accepted by NPC Student Services.	Mark Vest	Ongoing	Not less than 30 applications for Project Year Three received by 05/01/09.
4. Coordination of an S-STEM Career Fair for all high school students in the service area; open to non-traditional students also.	Mark Vest	05/01/09	S-STEM Career Fair takes place; interested parties contact NPC Student Services.
5. S-STEM Scholars begin classes; seminar class begins.	Dr. Pat Canary, PI and Randy Porch, Co-PI	09/01/08	S-STEM Scholars enrolled and attending classes per records.
6. S-STEM Scholars begin job shadowing.	Dr. Pat Canary, PI and Randy Porch, Co-PI	01/31/09	Each S-STEM Scholar has shadowing portfolio.
7. Progress of S-STEM Scholars monitored through regular courses and seminar class.	Dr. Pat Canary, PI and Randy Porch, Co-PI with other NPC faculty.	Ongoing	Interventions as needed to provide ongoing support to S-STEM scholars.
8. List of guest speakers and instructors for seminar class updated for Project Year 3.	Dr. Pat Canary, PI and Randy Porch, Co-PI	05/31/09	List of identified guest speakers and instructors updated.
9. List of project partners to provide job shadowing / professional mentoring / internship opportunities in S-STEM professions updated for Project Year 3.	Dr. Pat Canary, PI and Randy Porch, Co-PI	05/31/09	Database of project partners and contact information; shadowing / mentoring / internship opportunities updated.
10. Pool of professional S-STEM tutors at each cohort location updated for Project Year 3.	Mark Vest	05/31/09	List of tutors and their contact information updated.

11. Application committee reviews applications and selects scholars.	Dr. Pat Canary, PI; Randy Porch, Co-PI; Mark Vest	06/30/09	Not less than 24 S-STEM Scholars accepted for Project Year Three.
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Project Year Three: 09/01/09-08/31/10

Strategies	Responsible Person	Completion Date	Outcome Measures
1. Year 3 S-STEM Scholars meet with their advisors to develop degree plans; Year 2 Scholars meet to ensure progress and modify plans as needed.	Mark Vest	08/01/09	Each S-STEM Scholar has a degree plan for AAS on file with a S-STEM discipline identified.
2. Marketing recruitment plans reviewed and refined	Mark Vest; NPC Director of Marketing	08/01/09	Marketing & recruitment continues; interested parties contacting Student Services.
3. Applications for S-STEM Scholars accepted by NPC Student Services.	Mark Vest	Ongoing	Not less than 30 applications for Project Year Four received by 05/01/10.*
4. Coordination of an S-STEM Career Fair for all high school students in the service area; open to non-traditional students also.	Mark Vest	05/01/10	S-STEM Career Fair takes place; interested parties contact NPC Student Services.
5. Year Three S-STEM Scholars begin classes; seminar class begins.	Dr. Pat Canary, PI and Randy Porch, Co-PI	09/01/09	S-STEM Scholars enrolled and attending classes per records.
6. Year Three Scholars begin job shadowing; Year Two Scholars begin internships; lab aide work.	Dr. Pat Canary, PI and Randy Porch, Co-PI	01/31/10	Each S-STEM Scholar has shadowing / internship portfolio.
7. Progress of S-STEM Scholars monitored through regular courses and seminar class.	Dr. Pat Canary, PI and Randy Porch, Co-PI with other NPC faculty.	Ongoing	Interventions as needed to provide ongoing support to S-STEM scholars.
8. First S-STEM scholars (Year 2) complete coursework.	Dr. Pat Canary, PI; Randy Porch, Co-PI; M. Vest	05/31/10	S-STEM Scholars matriculate to university or become employed in S-STEM field.
9. Project speakers, instructors, partners; tutors updated and revised as needed.	Dr. Pat Canary, PI; Randy Porch; M. Vest	05/31/10	Databases updated.

10. Application committee reviews applications and selects scholars.	Dr. Pat Canary, PI; Randy Porch, Co-PI; Mark Vest	06/30/10	Not less than 24 S-STEM Scholars accepted for Project Year Four.**
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***If project is able to secure funding beyond scope of original grant.**

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Project Year Four: 09/01/10-08/31/11

Strategies	Responsible Person	Completion Date	Outcome Measures
1. Year 4 S-STEM Scholars meet with their advisors to develop degree plans; Year 3 Scholars meet to ensure progress and modify plans as needed.	Mark Vest	08/01/10	Each S-STEM Scholar has a degree plan for AAS on file with a S-STEM discipline identified.
2. Marketing recruitment plans reviewed and refined	Mark Vest; NPC Director of Marketing	08/01/10	Marketing & recruitment continues; interested parties contacting Student Services.
3. Applications for S-STEM Scholars accepted by NPC Student Services.	Mark Vest	Ongoing	Not less than 30 applications for Project Year Four received by 05/01/11.*
4. Coordination of an S-STEM Career Fair for all high school students in the service area; open to non-traditional students also.	Mark Vest	05/01/11	S-STEM Career Fair takes place; interested parties contact NPC Student Services.
5. Year 4 S-STEM Scholars begin classes; seminar class begins.	Dr. Pat Canary, PI and Randy Porch, Co-PI	09/01/10	S-STEM Scholars enrolled and attending classes per records.
6. Year 4 Scholars begin job shadowing; Year 3 Scholars begin internships; lab aide work.	Dr. Pat Canary, PI and Randy Porch, Co-PI	01/31/11	Each S-STEM Scholar has shadowing / internship portfolio.
7. Progress of S-STEM Scholars monitored through regular courses and seminar class.	Dr. Pat Canary, PI and Randy Porch, Co-PI with other NPC faculty.	Ongoing	Interventions as needed to provide ongoing support to S-STEM scholars.
8. Year 3 S-STEM scholars complete coursework.	Dr. Pat Canary, PI; Randy Porch, Co-PI; M. Vest	05/31/11	S-STEM Scholars matriculate to university or become employed in S-STEM field.
9. Project speakers, instructors, partners; tutors updated and revised as needed.	Dr. Pat Canary, PI; Randy Porch, Co-PI; M. Vest	05/31/11	Databases updated.

10. Application committee reviews applications and selects scholars.	Dr. Pat Canary, PI; Randy Porch, Co-PI; Mark Vest	06/30/11	Not less than 24 S-STEM Scholars accepted for Project Year Five.**
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***If project is able to secure funding beyond scope of original grant.**

**** If project is able to secure funding beyond scope of original grant.**

Project Year Five: 09/01/11-08/31/12

Strategies	Responsible Person	Completion Date	Outcome Measures
1. Year 4 Scholars meet to ensure progress and modify plans as needed.	Mark Vest	08/01/11	Each S-STEM Scholar has a degree plan for AAS on file with a S-STEM discipline identified.
2. Coordination of an S-STEM Career Fair for all high school students in the service area; open to non-traditional students also.	Mark Vest	05/01/12	S-STEM Career Fair takes place; interested parties contact NPC Student Services.
3. Year 4 Scholars begin internships; lab aide work.	Dr. Pat Canary, PI and Randy Porch, Co-PI	01/31/12	Each S-STEM Scholar has internship portfolio.
4. Progress of S-STEM Scholars monitored through regular courses and seminar class.	Dr. Pat Canary, PI and Randy Porch, Co-PI with other NPC faculty.	Ongoing	Interventions as needed to provide ongoing support to S-STEM scholars.
5. Year 4 S-STEM scholars complete coursework.	Dr. Pat Canary, PI; Randy Porch, Co-PI; M. Vest	05/31/12	S-STEM Scholars matriculate to university or become employed in S-STEM field.
6. Data for summative evaluation gathered and reviewed, based on ongoing formative evaluations and S-STEM scholar data and feedback.	Dr. Pat Canary, PI; Randy Porch, Co-PI; M. Vest	05/31/12	Summative report prepared and sent to funder.
7. If project has proven successful as evidenced by achievement of goals, and if further funding has been secured, project will continue as described in previous years.	Dr. Pat Canary, PI; Randy Porch, Co-PI; Mark Vest	06/30/12	Project is sustained.