DOE/TE/00041--T1

Final Report

to

U.S. Department of Energy
PREP Program

PROJECT TITLE: *Northland Science Discovery*

PROJECT DIRECTOR: *Ann Sigford*

REPORTING PERIOD: *February 15, 1995 to February 14, 1997*

RECIPIENT ORGANIZATION: *The College of St. Scholastica*

1200 Kenwood Avenue
Duluth, Minnesota 55811

INSTRUMENT NUMBER: *DE-FG02-95TE00041*

AMENDMENT NUMBER: *A000*

MASTER

DISCLAIMER

This is a final report on the U.S. Department of Energy's grant of $39,900 to the PLUS Center at The College of St. Scholastica for a PREP program called Northland Science Discovery (NSD). The period of the grant is from February 15, 1995 to February 14, 1997. This report includes an overview of the past year's progress toward achieving the goals established for the project, a description of the results of these efforts and their relationship to the project goals, and appendices documenting program activities, accomplishments, and expenditures.

PROJECT GOALS AND PROGRESS ACHIEVED

The goal of Northland Science Discovery is to provide science and math enrichment activities for students traditionally underrepresented in science (girls, minorities, low-income, and rural children). We work toward this goal by providing a four-week residential, research-based, science and math youth camp which serves approximately 25 students per year. NSD has been held each summer since 1992. This program also has an academic-year component consisting of reunions.

The specific objectives, as described in the grant application, are listed below. A description of relevant NSD activities is provided for each objective.

1. Increased problem-solving skills, focusing on the ability to develop and test hypotheses.

Students who attend NSD camp participate in the scientific process. One aspect of this is developing hypotheses. Students work with instructors to develop and test hypotheses through group projects in class and through their own research projects.

2. Increased ability to make quantitative observations and to analyze and present data through a variety of methods.

NSD students collect and analyze data and then communicate the results. A major focus of this aspect of camp is the use of computers to present research findings. All students are required to participate in the development and implementation of a group research project and in the presentation of the results using computer-generated material such as graphs and overhead transparencies. The focus on learning science by doing continues to be an effective format, especially for girls and minority students.

3. Increased interdisciplinary understanding of scientific and mathematical concepts related to natural resources.

NSD students are led by instructors toward an interdisciplinary understanding of problems and solutions. This includes exploring verbal and graphical expressions of results. An important aspect of this integration process is the incorporation of math into the various sciences.

4. Increased awareness of career opportunities in science and mathematics.

The objective of increasing awareness of career opportunities in science and math was met through tours of scientific institutions and by exposing students to local scientists (mostly female) during the summer camp as well as reunions. Instructors and guest scientists serve as role models and friends.

PROJECT CONTENT

There were no major changes from the proposed project in content, length, or schedule. A program brochure and camp schedule can be found in Appendix A. The 1996 NSD camp was held at The College of St. Scholastica from July 8 through August 2, 1996. The camp included a variety of hands-on science and math activities which were held in classrooms, science laboratories, and the teaching computer laboratory. In addition, a number of off-campus field trips were taken to expose students to other science institutions and professionals. Wherever possible, and especially on the field trips, the instructors taught units which integrated their various areas of expertise.

During the first week of camp, each student selected an instructor and a research topic on which to work. The students learned how to construct a hypothesis, design and execute the experiment, and report the results. The final week of camp, students made oral presentations on their projects to parents, instructors, and peers. The presentations were enhanced by graphics and audiovisual materials.

Throughout the camp, students were encouraged to work together and resolve differences, to learn about diversity and respect others, and to appreciate new friends. The camp provided participants with a special opportunity to develop relationships with other students interested in science.

Follow-Up Sessions

NSD follow-up sessions, or reunions, continue to be an important feature of the program. This year's reunion was held on Saturday, September 21, 1996, at St. Scholastica. Students spent the day working on physics activities using pinhole cameras and hot air balloons. It was also a time for catching up with "science buddies" from the summer session. We have found that the friendships made during camp are lasting and supportive.

Attendance is an indicator of the impact that NSD has on the students. Sixteen enthusiastic students from a one hundred mile radius showed up for this year's reunion. Distance driving is unquestionably a consideration for parents bringing a child from a rural area to a one-day event. The willingness of these parents to bring their children to a NSD reunion is an indication of the importance that parents place on the camp experience.

As they completed the reunion evaluation survey, students were provided an opportunity to reflect on their past summer's experience at NSD. Students were asked to respond to statements including; "What I remember most about NSD is..." and "The most important thing about NSD, for me, was..." Meeting new friends and learning more about science were frequent answers.

Program Personnel

Program personnel included five instructors from The College of St. Scholastica and Duluth-area schools. This allowed for a low student:adult ratio which promoted maximum learning opportunities. The five instructors, the educational institutions where they teach, and their areas of expertise are as follows:

INSTRUCTOR	*EMPLOYER*	*FIELD OF STUDY*
Buzz DeLaRosby	Two Harbors High School	Physics
Barb LaMourea	Hermantown High School	Biology
Sheila Lindenberg	Charles Mott Community College, Flint, Michigan	Computer Technology
Nancy Nelson	University of Minnesota-Duluth	Geology
Dr. Paul Stein	The College of St. Scholastica	Biochemistry

The diversity in the instructors' backgrounds provided a broad foundation of expertise which helped ensure that the program was appropriately challenging. In addition to the instructors, college science majors assisted with labs, field trips, and recreational time. These college-age counselors provided an important link, serving as role models for the students in addition to providing dormitory supervision.

RESULTS - Demographics

A continuing objective of the PLUS Center and NSD is to recruit minority, female, rural, and economically-challenged students. The following section of the report includes a review of the results of our recruitment efforts for each of these categories; complete data is provided in Appendix B. The information presented below was gathered from program application forms. All applicants were required to submit forms including parental consent, basic demographic data, and a personal statement on why they wanted to participate in the program. A report on grades achieved and a letter of reference from a teacher or counselor were also required from all applicants.

Selection of students for admission to NSD was based primarily on interest, motivation, and ability to achieve as interpreted from each applicant's response to questions as well as the letters of reference, teacher recommendations, and, secondarily, on grades. The application form included a statement that preference would be given to qualified applicants who were low-income, rural, or minority.

Minority Students

The overall minority population of the Arrowhead region of Minnesota is 4 percent. American Indians, at 2.3 percent, make up the largest segment of the minority category. We are pleased that in 1996 we had a 20 percent minority representation in NSD. All six minority applicants were accepted. One declined due to another commitment. The percentage of 1996 NSD program participants that were of American Indian heritage was 12 percent.

One of the significant benefits for American Indian students who participate in NSD is that they will most likely qualify and be prepared for the PLUS Center's new high school Upward Bound Math and Science program entitled SUMS (Success in Understanding Math and Science). This federally funded program has goals that are similar to those established for NSD. However, SUMS integrates language content, in this case Ojibwe, into program activities. Moreover, SUMS is a four-year program, with retention expected between the years. In other words, a student could graduate from NSD, move to SUMS for several years, and participate in a Summer Bridge program to college. There are eleven former NSD students currently enrolled in SUMS.

Female Students

In 1996, twenty female students participated in the NSD program; they represented 80 percent of the NSD population. An interesting phenomenon was that 16 of the students had previously attended FAST Camp. Of these 16, seven attended FAST Camp 1994, six were students who attended the PLUS Center's 1995-96 Science Connections program (an academic year program designed to bridge the gap between NSD and FAST Camp), and another three attended FAST Camp 1995, but not Science Connections. Previously, an average of four students per summer "stayed in the pipeline" between FAST Camp and NSD.

Rural Students

We define rural students as those residing more than 30 miles from Duluth-Superior, and from communities with populations of less than 5,000. Using this definition, 18 of the 25 NSD students (72 percent) lived in rural areas. The success in serving rural students is clearly linked to the residential aspect of the program.

Economically-Challenged Students

Nearly all NSD students are from families with low incomes. We verify family income by having parents provide a tax return. Over half of the 1996 NSD participants were from families with annual incomes less than $20,000. All qualified for at least partial scholarship support for program participation.

We have attempted to make all our recruitment methods culturally sensitive by avoiding the use of any methods that would screen out students of color and students from lower income families. In the recruitment/selection process overall, we are trying to achieve the correct balance between obtaining the information we need, being kind and respectful to the families we serve, and giving all qualified applicants a fair chance. A recruiter assisted us in achieving our goals by making 28 site visits to schools and community centers.

RESULTS - Evaluations

Several methods of evaluation were used for students, parents, and instructors. Summaries of surveys filled out by students are provided in Appendix C.

A camper evaluation was used to help us determine what the students liked and didn't like about the program. Predictably, camp rules were the least popular, while facilities and food were rated excellent or good by most of the students. Although participants indicated a range of opinions about the usefulness of field trips and other program activities, most students felt that the trip to the Twin Cities was a definite highlight of the camp. In addition, the physics research group was particularly dynamic. During this hands-on project, students worked on physics concepts used in the design of bottle rockets. As they became more involved in their experiments, students' enthusiasm for and interest in the project spread; soon the whole camp was excited about physics. Overall, the survey results were very positive.

The second type of evaluation used was a pre and post survey of students' attitudes towards math and science. (A copy of the survey form along with a summary of the results are included in Appendix C.) The results are summarized by math attitudinal changes and science attitudinal

changes as well as by gender of the student. These results are hard to interpret since the sample size is rather small (in this case 17 useable matched surveys). Several surveys were illegible or so hastily completed that students clearly reversed the scales. Viewed in total, both math and science attitudes showed small declines from the beginning to the end of camp. This may reflect irritation at having to fill out forms. Although we find the information useful for program design, we may annoy the students by asking for as much information as we do.

An interesting factor was noted when male and female responses to the survey were separated; the three male responses accounted for nearly all the declines in science attitudes. Despite this decline, all three of the male participants attended the September 1996 reunion with enthusiasm. In comparison, females showed a small increase in positive attitudes in science, but a small decrease in math attitudes. The scores of the males showed no change in math attitudes.

A self-esteem/career survey was also administered at the beginning and again at the end of the four-week program. Overall, this survey showed no significant changes. However, the responses to one of the questions were especially noteworthy. Students were asked to what degree they agreed with the statement, "I can give a good talk in front of my class." Both males and females were more confident of their public speaking ability after NSD. The research presentation aspect of this program tends to be a highlight for parents as well as students. While not conclusive, the attitude and self-esteem results give us food for thought as we attempt to design a coeducational camp that promotes positive attitudes and confidence toward math and science, by both males and females. In general, the students indicate that they are college-bound, and intend to continue with math and science classes in school.

The fourth student evaluation pertained to the fall reunion which focused on the theme of hot air balloons (see next section). A special aspect of this survey was an invitation for the students to reflect on how NSD has made a difference in their lives. It is clear from their comments that the opportunity to make science friends is a key part of the positive impact of the program.

In addition to surveying students, we administered a parent/guardian questionnaire on the first day of the camp to help us understand more about parents' attitudes toward science and mathematics (Appendix D). A highly positive attitude toward science and mathematics was demonstrated by most parents.

Camp counselors and instructors provided verbal evaluation of the program (Appendix E). The suggestions secured from the evaluation session will be useful in planning next year's camp.

CRITIQUE OF PROJECT

While we are pleased with the overall success of NSD, we feel that the excellence of the program is achieved by maintaining an awareness of ways to improve or enhance all components of the program. Currently, two areas of discussion are program evaluation and recruitment.

Process and Outcome Evaluation. The PLUS Center is committed to evaluating all of its programs in two ways - by looking at the process (*did we do what we said we would do?*) and by the outcomes (*has our program had a positive effect?*). In general, we have met and documented the achievement of our process goals. For example, the primary objective of NSD is "to provide

science and math enrichment activities for 8th - 10th grade students traditionally underrepresented in science (girls, minorities, low-income, and rural children)." We have achieved this goal, and it was relatively easy to document.

On the other hand, it has been more difficult to document that we have met our outcome goals. As stated in our original proposal, the overall goal of NSD is to increase interest, confidence, participation, and understanding in science and mathematics. This goal is very broad and more difficult to evaluate. We can, however, look for changes in either the behavior or the attitudes of students attending NSD. The continuing impact of the program is supported by the large number of students who returned for the reunion as well as the number who signed up for participation in the SUMS program. Comments on the reunion evaluation forms such as "I have now decided to enter a field of science" and "learning more about science (is important)" help to document the achievement of our outcome goals.

Now that NSD has been offered for several years, we are interested in following up with our students to see if we can get more insight into the attainment of our outcome goals. Long-term tracking to determine if there are behavioral benefits that persist after program attendance has been a dream for the PLUS Center that, until recently, was beyond our reach. An exciting new opportunity offered by The College of St. Scholastica is the installation of a user-friendly relational database. Data on all the 1996 NSD Camp participants, as well as information on program participants for the previous five years, have been entered into the system. Plans are to use the database to track students through PLUS programs and beyond. This system will provide the long-term information that will help us in the assessment of our success in reaching the outcome goals established for NSD.

DISSEMINATION OF INFORMATION

Information about NSD has been shared whenever possible, including at the NSF Model Projects for Women and Girls Awardees meeting in Washington, D.C., where the PLUS Center Director presented information on PLUS Center programs. As we reported last spring, the PLUS Center Director also presented a poster session at the Department of Energy PREP Director's meeting in November of 1995. In addition, PLUS Center personnel presented information about NSD at the NSTA Global Summit-San Francisco in December of 1996.

In 1996, College Communications staff sent photos and press releases to the NSD students' hometown newspapers. This resulted in the publishing of several articles which included photos of the students actively involved in sampling or other research activities (Appendix F). College Communications also arranged for a local television news team to film the NSD graduation ceremonies. This feature was aired on the 6:00 P.M. and 10:00 P.M. news programs, and it included an interview with the program coordinator.

CONCLUSION

We deeply appreciate the funding provided by the Department of Energy for this project. Your support helped facilitate the transition of NSD from a commuter to a residential camp. As a result, this science experience is now much more accessible to rural and minority students.

APPENDICES

APPENDIX A: *Project Content*

1. *Brochure*
2. *Camp Schedules*

APPENDIX B: *Participant Demographics*

1. *Summary of Applicants*
2. *Participant Statistics*
3. *Participant List*

APPENDIX C: *Participant Evaluations*

1. *Camper Evaluation*
2. *Math and Science Attitude Survey Form*
3. *Pre and Post Survey of Math and Science Attitudes*
4. *Pre and Post Survey of Career Goals/Self-Esteem*
5. *Reunion*

APPENDIX D: *Parent Survey*

APPENDIX E: *Camp Staff Evaluation*

APPENDIX F: *Publicity*

APPENDIX G: *PREP Attendance Summary Sheet*

APPENDIX H: *Financial Information*

1. *Financial Status Report*
2. *Federal Cash Transactions Report*
3. *Request for Advance or Reimbursement*
4. *June 30, 1996 College of St. Scholastica Audit*

APPENDIX A

Project Content

Brochure
Camp Schedules

PLUS

Promoting Learning Among Underrepresented in Science

The College of St. Scholastica has a distinguished history of promoting women and minorities in science and math. The PLUS Center is a cornerstone in this effort.

The PLUS Center works with northeastern Minnesota school districts, scientists and professional organizations to promote learning and leadership among women and minorities in science and math. Our goal is to increase awareness in students, teachers and parents about the importance of female and minority participation in science and math.

In selecting individuals for participation and otherwise in the administration of this project the PLUS Center, The College of St. Scholastica, will not discriminate on the grounds of race, creed, sex, color, age, handicap, or national origin of any applicant.

This project is supported by the Minnesota Higher Education Coordinating Board; United States Department of Energy, Office of Energy Research, through its Office of University and Science Education Programs; and The College of St. Scholastica.

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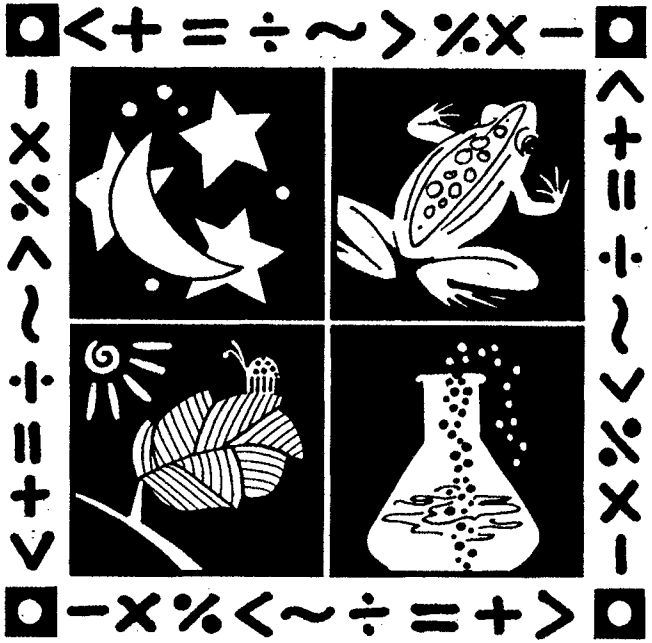
Northland SCIENCE



Discovery

The College of St. Scholastica

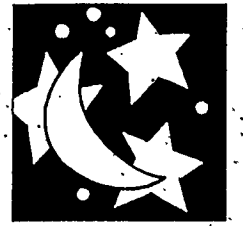
A four-week science program for students entering grades 8, 9 or 10 in the fall of 1996

July 8 - August 2, 1996

Sponsored by the PLUS Center,
The College of St. Scholastica, Duluth, Minnesota

Northland SCIENCE Discovery

Where students make science discoveries!



The four-week Northland Science Discovery program gives students a chance to work with Duluth area scientists and teachers, and develop their own research projects with the help of these scientists. Students will: choose a science research project, develop hypotheses, design experiments, collect data, use computers to help analyze their findings, and make a final oral presentation. Science related field trips and tours will also be provided.

Innovative earth science, biology, math, chemistry, and ecology classes will meet each day to help guide students through the research process. Northland Science students will reside in Somers Hall on the campus of St. Scholastica. Students selected will be required to attend two follow-up science activities in October and May during the 1996/1997 school year.

Location/Instructors

Northland Science Discovery will be held on The College of St. Scholastica campus in Duluth, Minnesota. Students will meet in the Science Center for classroom activities, have meals in the Greenview Dining Room, and explore the beautiful 160-acre campus during field research. Instructors include faculty from The College of St. Scholastica and Duluth schools.

Fees and Scholarships:

The program is free to qualifying students. Higher income students will be expected to pay partial tuition – up to $900 for the four weeks.

What's Included:

- Lodging and meals in Somers Hall dormitory Monday-Friday. Students will return to their homes on Friday nights through Sunday nights.
- Resident camp counselors will accompany participants at all times.
- Field trips to north shore state parks, the EPA's research laboratory, high-tech medical labs, a Lake Superior research ship, Park Point, Minnesota Zoo, Science Museum, Museum of Electricity and more!
- A chance to meet a variety of working scientists.
- Fun math and science activities.

Who is Eligible?

Young men and women entering grades 8, 9, or 10 in fall 1996 and residing in Minnesota or Wisconsin. Preference will be given to students attending school in northeastern Minnesota or northwestern Wisconsin.

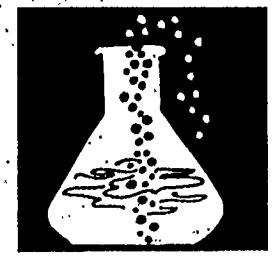
Selection Criteria

The Northland Science Discovery committee will select applicants on the basis of their letters of recommendation, academic performance, and completed application. Preference will be given to qualified females, minorities, low income or rural students. Applicants will be informed of their status by April 30, 1996. Enrollment is limited.

A Complete Application Includes:

1. The attached student application form.
2. A copy of your report cards (or equivalent) from the 1995/1996 school year.
3. Completed science essays (see application).
4. Two letters of recommendation using the attached forms. At least one of the letters must be from a teacher or counselor. The second letter may come from a community elder, scout leader, religious or spiritual leader or another teacher. Recommendations should be sent directly to the address listed below by the teacher/community elder. Items 1-3 should be mailed together and post-marked by March 15, 1996 to:

Northland Science Discovery
PLUS Center
The College of St. Scholastica
1200 Kenwood Avenue
Duluth, MN 55811



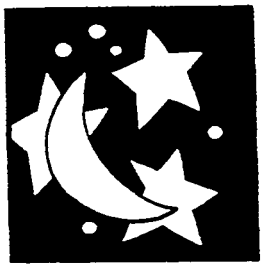
Parent Participation

Parents are invited to participate the first and last days of the program. On the first day there wil be an introduction to the month's events and on the last day students will present their research. You won't want to miss it!

For More Information

Contact the PLUS Center, The College of St. Scholastica, 1200 Kenwood Avenue, Duluth, Minnesota 55811, (218) 723-6722 or 1-800-447-5444.



Essays

Attach a separate sheet with essays on each of the following science questions:
Each answer should be 50-250 words in length.

1) Why do you want to attend Northland Science Discovery?

2) What is your favorite area of science and why?

3) What careers interest you and why?

4) How does science play a role in your everyday life?

5) What scientific question would you like to know the answer to and why?

Send this application, science essays and grades, to:

Northland Science Discovery
PLUS Center
The College of St. Scholastica
1200 Kenwood Avenue
Duluth, MN 55811




Northland SCIENCE Discovery 1996 Application (please print all responses)

Please make additional copies as needed.

Student

Name _____ Social Security Number _____

Address _____ City, State, Zip _____

Phone _____ Parent/Guardian Name _____

Grade (September 1996) _____ School _____

Gender: _____ female _____ male

Check race/ethnic group(s): ____ American Indian ___ Asian/Pacific Islander ___ Black ___ Hispanic ___ White

Special Qualifications (See Selection Criteria). _____

_____

To be eligible for consideration as a Northland Science Discovery participant, each student must be recommended in writing by a current teacher or counselor. Recommendations from relatives will not be accepted. A second recommendation may come from a community elder, scout leader, a religious or spiritual leader or another teacher. Recommendations should be made on the enclosed **Recommendation Forms** (make additional copies as needed). Completed recommendations should be placed in a sealed envelope and mailed directly to the PLUS Center by the person completing the recommendation form.

Two recommmendations are being sent from:

1. _____
   Name | Title/Position | Phone Number
2. _____
   Name | Title/Position | Phone Number

Parent/Guardian

Scholarships have been awarded to families with incomes of $50,000 or less in previous years. Eligibility for scholarships depends on the pool of applicants and family situations. The following financial information must be completed in order to be considered for a scholarship. All information is confidential and is used only by the PLUS Center for scholarship purposes.

Please answer the questions below:

1. Indicate income range: _____ $0-20,000 ____$20-50,000 ____$50-60,000 ____above $60,000
2. Are you applying for a scholarship? _____ yes _____ no

If no, please sign and date bottom of form. Applicants without parent/guardian signatures will not be processed. If your child is selected an invoice for tuition will be sent to you.

If yes, please complete questions 3-9.

3. Does your family receive county, state or federal financial assistance of any kind? ____yes ____no

If yes, please complete the enclosed (blue) form and send it to your case/social worker who can verify your assistance. Please continue.
If no, please continue.

4. Number of children living in your household during the 1995 income tax year. ____
5. Adjusted gross income for the 1995 tax year. Do not include non-taxable income. _____
6. Please attach a copy of the first page of the parent(s)/guardians 1995 Federal Income Tax Return which documents the Adjusted Gross Income. If a student's parents are divorced or separated at the time of application and the parents file jointly for the 1995 tax years, a copy of the W-2 form(s) for the parent with whom the student is living must be attached with a copy of the first page of the joint income tax return.
7. If you were not required to file a 1995 income tax return, please explain why you were not required to do so. Please attach a sheet of paper with your explanation and forward any supporting documents.
8. In order for your child to qualify for a Northland Science Discovery scholarship, you must be able to show that you could not afford to pay for such services yourself. Generally, this decision is based on last year's income, but in special cases, it can be based on this year's income. If you can show that there has been a major change in your family's financial condition since last year, then please explain your situation on a separate sheet and attach it and any other supporting documents.
9. **Please sign and date information below.**

I certify that the above information is true and correct. I understand that this form is used to establish eligibility for a Northland Science Discovery scholarship and that if I purposely give false or misleading information on this form, the scholarship will be revoked. All information is confidential and is used only by the PLUS Center for scholarship purposes.
Signature of Parent/Legal Guardian _____ Date _____

Applications must be postmarked by March 15, 1996

– over –

Northland SCIENCE Discovery

1996 Recommendation Form

Name of Northland Science Discovery applicant _____

Your Name _____

Title _____ Daytime Phone _____

Association with the applicant _____

How long have you know this applicant? _____

Teachers Only:

What is this student's approximate rank in your class? _____

Letter grade average overall? _____ Science? _____ Math? _____

Areas of excellence, special abilities, talents: _____

_____

_____

_____

Areas that require further development: _____

_____

_____

_____

Are you aware of special qualifications this applicant may have (disabled, minority, rural, low income, family hardships)? If so, please explain._____

_____

_____

Please respond to the following attributes regarding the applicant. (1=low 3=average 5=high)

_____ Ability to work with others
_____ Ability to solve problems
_____ Motivation to complete work
_____ Ability to do work independently
_____ Self-awareness
_____ Communication skills
_____ Level of maturity for grade level
_____ Leadership qualities
_____ Degree of parental support
_____ Successfulness of peer relationships
_____ Curiosity

Please indicate why this applicant would benefit by attending Northland Science Discovery. _____

_____

_____

_____

_____

_____

Please attach a separate sheet with any additional comments.

(Signature) _____ (Date) _____

The person completing this recommendation form should seal it in an envelope and mail it directly to: Northland Science Discovery, PLUS Center, The College of St. Scholastica, 1200 Kenwood Avenue, Duluth, MN 55811. **All recommendations must be postmarked by March 15, 1996.**

The PLUS Center thanks you for your assistance in recommending this student.

to: Northland Science Discovery, PLUS Center, The College of St. Scholastica, 1200 Kenwood Avenue, Duluth, MN 55811. **All recommendations must be postmarked by March 15, 1996.**

Northland Science Discovery - 1996
Tentative Schedule

June 27, 1996

Week One

	Monday, July 8	Tuesday, July 9	Wednesday, July 10	Thursday, July 11	Friday, July 12
7:30		Breakfast	Breakfast	Breakfast	Breakfast
8:00		T-Shirts/Research	Tour Briefing	Tour Briefing	Research
8:30		"	"	"	"
9:00	Registration	"	WLSSD	St Mary's	"
9:30	"	"	"	"	"
10:00	Orientation	"	"	"	"
10:30	"	"	"	"	"
11:45	Lunch/Rec	Lunch/Rec	Lunch/Rec	Lunch/Rec	Lunch/Rec
1:00	Instructors Present	Computer	Computer	Computer	Computer
2:00	Research	Biology/ Physics	Geology / Chemistry	Research	Research
2:30	"	"	"	"	"
3:00	"	"	"	"	"
3:30	"	"	"	"	"
4:00	"	"	"	"	Departure
4:30	"	"	"	"	
5:00	Recreation	Recreation	Recreation	Recreation	
5:30	Dinner	Dinner	Dinner	Dinner	
6:00	Recreation	Recreation	Recreation	Recreation	
6:30	Recreation	"Exotic Species""	"Fun w/Polymers"	Omnitheatre	

Week Two

	Monday, July 15	Tuesday, July 16	Wednesday, July 17	Thursday, July 18	Friday, July 19
7:30		Breakfast	Breakfast	Breakfast	Breakfast
8:00	Check In	Research	Boulder Lake	Research	Research
8:30	"	"	(18th rain day)	"	"
9:00	Research	"	"	"	"
9:30	"	"	"	"	"
10:00	"	"	"	"	"
10:30	"	"	"	"	"
11:45	Lunch/Rec	Lunch/Rec	"	Lunch/Rec	Lunch/Rec
1:00	Computer	Computer	"	Computer	Presentations
2:00	Biology/ Chemistry	Geology /Physics	"	Research	"
2:30	"	"	"	"	"
3:00	"	"	"	"	"
3:30	"	"	"	"	New Groups
4:00	"	"	"	"	Departure
4:30	"	"	"	"	
5:00	Recreation	Recreation	Recreation	Recreation	
5:30	Dinner	Dinner	Dinner	Dinner	
6:00	Recreation	UMD hike	Recreation	Recreation	
6:30		UMD Planetarium	Recreation		

Week Three

	Monday, July 22	Tuesday, July 23	Wednesday, July 24	Thursday, July 25	Friday, July 26
7:30		Breakfast	Breakfast	Breakfast	Breakfast
8:00	Check In	Tour Briefing	Research	Research	Briefing
8:30	"	"	"	"	"
9:00	Research	EPA Lab	"	"	"Papermaking with Potlatch"
9:30	(New Group!)	"	"	"	"
10:00	"	"	"	"	"
10:30	"	"	"	"	"
11:45	Lunch/Rec	Lunch/Rec	Lunch/Rec	Lunch/Rec	Lunch/Rec
1:00	Computer	Computer	Gooseberry	Computer	Computer
2:00	Geology/ Physics	Chemistry/ Biology	"	Chemistry/Biology	Research
2:30	"	"	"	"	"
3:00	"	"	"	"	"
3:30	"	"	"	"	"
4:00	"	"	"	"	Departure
4:30	"	"	"	"	
5:00	Park Point	Recreation	"	Recreation	
5:30	Picnic	Dinner	"	Dinner	
6:00	"	Recreation	"	Recreation	
6:30	"	"GEE WHIZ!"	"	"Fossils!"	

Week Four

	Monday, July 29	Tuesday, July 30	Wednesday, July 31	Thursday, Aug. 1	Friday, Aug. 2
7:30		Mpls	Mpls	Breakfast	Breakfast
8:00	Check In	"	"	Research	Research/Rehearsal
8:30	"	"	"	"	"
9:00	Research	"	"	"	"
9:30	"	"	"	"	"
10:00	"	Bakken	Ride Science!	"	"
10:30	"	"	"	"	"
11:45	Lunch/Rec	"	"	Lunch/Rec	Lunch/Rec (11:30)
1:00	Computer	"	"	Research	Parent Session (12:00)
2:00	Geology/Physics	"	"	"	Presentations (12:30)
2:30	"	MN Zoo	"	"	Graduation/Bottle Rockets
3:00	"	"	"	"	"
3:30	"	"	"	"	Departure
4:00	"	"	"	"	
4:30	"	"	"	"	
5:00	Recreation	"	"	Recreation	
5:30	Dinner	"	Dinner	Dinner	
6:00	Bottle Rockets	Pizza!	Movie	Rec/Research	
6:30		"	"	"	

What do cameras and hot air balloons have in Common?

Northland Science Discovery - 96 Reunion

Join us for a day of Fun Science as we explore Chemistry and Physics using pinhole cameras and hot air balloons.

When: **Saturday, September 21, 1996**

9 a.m - 10a.m.	**Registration, Sweet Rolls and Schmoozing**
10 a.m. to 12	**CAMERAS!**
12 - 1:30 p.m.	**Lunch (and some time to catch up, play some volleyball!**
1:30 p.m. - 4	**HOT Air Ballons!**

Where: **Science 270**
The College of St. Scholastica

Please send the enclosed response form to Katie Neff Dawson
Questions? Call Katie at (218)723-6722

NORTHLAND SCIENCE DISCOVERY

September 21, 1996

Reunion

9:30 a.m.	Welcome, Announcements, etc. (Room 270)
10:00 a.m.	Pinhole cameras with Physics Teacher, Darrin Johnson (Room 223)
12:00 noon	LUNCH (Greenview Dining Room)
1:00 p.m.	Hot Air Balloons with Maria Hamlin (Room 223)
3:00 p.m.	Social Hour and evaluations (Room 270)
4:00 p.m.	Departure

APPENDIX B

Participant Demographics

Summary of Applicants
Participant Statistics
Participant List

Northland Science Discovery 1996
Summary of Applications

Summary of applicants: 41 total applicants (32 girls: 9 boys)

2 Wisconsin = 2 eighth graders
39 Minnesota = 3 tenth graders; 12 ninth graders; 24 eighth graders

WISCONSIN

NUMBER OF APPLICANTS	SCHOOL	GRADES
2	Central	8th (2)

MINNESOTA

NUMBER OF APPLICANTS	SCHOOL	GRADES
1	Aitkin	8th (1)
2	Albrook	8th (2)
1	Big Fork Jr. High	8th (1)
1	Central (Duluth)	10th (1)
1	Cloquet High School	9th (1)
2	Cook High School	8th (1) 9th (1)
2	Cotton	8th (2)
1	Deer River High School	8th (1)
1	Denfield High School	9th(1)
2	Ely	8th (1) 10th (1)
2	Eveleth-Gilbert	8th (2)
1	Falls High School	9th (1)
1	Fondu Lac Ojibway School	8th (1)
4	Grand Rapids	8th (2) 9th (2)
1	Hermantown	8th (1)

1	Hibbing	9th (1)
1	John J Kennedy School	9th (1)
3	Marshall	8th (2) 9th (1)
2	Moose Lake High School	9th (1) 10th (1)
1	Mora	9th (1)
1	Morgan Park	8th (1)
1	Proctor	9th (1)
3	Two Harbors	8th (3)
1	Woodland Middle School	8th (1)

The College of St. Scholastica
PLUS Center

Northland Science Discovery - 1996
Program Participant Statistics

Total Number of Students - 25

Gender	**Number of Students**	**Percent of Students**
Females	20	80%
Males	5	20%
Ethnic Background		
White	20	80%
Black	1	4%
Hispanic	1	4%
Native American	3	12%
Family Income		
$0 - $20.0000	13	52%
$20.000 - $40.000	10	40%
$40.000-60.000	2	8%
Geographics		
Duluth/ Superior (urban)	7	28%
Rural	18	72%
Grades		
8th Grade	16	64%
9th Grade	8	32%
10th Grade	1	4%

Public School Districts

Duluth (709) - 4	4
St. Louis County (2142) - 6	6
Cloquet (094) - 1	1
Proctor (704) - 1	1
Eveleth-Gilbert (2154) - 2	2
Maple (3297) - 1	1
Grand Rapids (318) - 3	3
Lake Superior (381) - 1	1
Hermantown (381) - 1	1
International Falls (3361) - 1	1
Aitkin (001) - 1	1
Private - 3	3

Schools

Aitkin High School	1
Albrook High School	2
Central High School	1
Cloquet High School	1
Cook High School	2
Cotton High School	2
Denfield High School	1
Eveleth-Gilbert High School	2
Fond Du Lac Ojibwe School	1
Grand Rapids Middle School	2
Grand Rapids High School	1
Hemantown Middle School	1
Marshall	2
Morgan Park Middle School	1
Northwestern Middle School	1
Proctor High School	1
Two Harbors High School	1
Woodland Middle School	1

Northland Science Discovery 1996
Program Participant Statistics

	First Name	Last Name	City	Race	Grade	School	School Dist. #
1	THERESA	CHRISTIAN	CULVER	W	8	ALBROOK	2142
2	MELISSA	HANSEN	DULUTH	W	10	CENTRAL HIGH SCHOOL	709
3	CHERYL	HINDERMANN	DULUTH	W	9	DENFELD	709
4	JENNIFER	LANCOUR	POPLAR	AI	8	NORTHWESTERN	3297
5	LEAH	MAHER	COTTON	W	7	COTTON HIGH SCHOOL	2142
6	ADAM	MAZURK	COOK	W	9	COOK HIGH SCHOOL	2142
7	CASSANDRA	MCKAY	KELSEY	W	8	COTTON HIGH SCHOOL	2142
8	MICHELLE	MISKOWITZ	COOK	W	8	COOK HIGH SCHOOL	2142
9	LUKE	OMARZU	TWO HARBORS	W	8	TWO HARBORS HIGH	381
10	AMY	PULLAR	INT'L FALLS	W	9	FALLS HIGH SCHOOL	3361
11	ALEXANDRA	VONWEURTH-HART	MAHTOWA	W	8	MARSHALL	private
12	EMILY	ALBERIO	SAGINAW	H	9	MARSHALL	private
13	ELIZABETH	ANDERT	DULUTH	W	8	WOODLAND MIDDLE SCHOOL	709
14	REBECCA	HELLAND	CLOQUET	W	9	PROCTOR	704
15	KNUTE	NIX	BOVEY	W	9	GRAND RAPIDS MIDDLE SCHOOL	318
16	MAUREEN	ROBERTSHAW	BOVEY	W	9	GRAND RAPIDS MIDDLE SCHOOL	318
17	AURORA	VOGT	DULUTH	W	8	MORGAN PARK	709
18	KASANDRA	WIEDERHOLT	AITKIN	W	8	AITKIN	1
19	LAURA	YOUNG	GILBERT	W	8	EVELETH-GILBERT HIGH SCHOOL	2154
20	JENNA	KUITUNEN	GILBERT	W	8	EVELETH-GILBERT HIGH SCHOOL	2154
21	MARTIN	PAAVOLA	DULUTH	W	8	HERMANTOWN MIDDLE SCHOOL	381
22	NICHOLAS	ELIAS	CLOQUET	AI	9	CLOQUET SENIOR HIGH SCHOOL	94
23	LAURA	OAKGROVE	DULUTH	AI	7	FONDDU LAC OJIBWAY SCHOOL	private
24	KELLY	STISH	BOVEY	W	8	GRAND RAPIDS HIGH SCHOOL	318
25	REBECCA	CHRISTIAN	DULUTH	W	8	ALBROOK	2142

APPENDIX C

Participant Evaluations

Camper Evaluation
Math and Science Attitude Survey Form
Pre and Post Survey of Math and Science Attitudes
Pre and Post Survey of Career Goals/Self-Esteem
Reunion

The College of St. Scholastica
Duluth, Minnesota

PLUS Center

Northland Science Discovery 1996
Camper Evaluation

1. **What did you like most about Northland Science Discovery and why:**

- The really cool learnning experiences.
- Trip to Minneapolis.
- I enjoyed meeting new people who are interested in the same stuff I am.
- Instructors & counselors were great.
- Camp Snoopy (2) - we worked together & say the benefits & applications of physics.
- Cool experiments & tours.
- I learned a lot about science & life in general which I would never have had without this camp.
- Trip to MN Zoo. (2)
- I enjoyed the classes & trips because almost all hands-on & outside.
- Rec time & visiting with friends.
- Twin Cities & computers. (2)
- Physics - "hands-on"
- Working in the bio group getting ready for presentations because I liked putting all our data together to make it make sense.
- Going to the Cities. (4)
- Physics & biology.
- Gooseberry Falls - it was so beautiful.
- Trips.
- Meeting friends, getting wet, staying in dorms.
- Omnimax.

2. **What did you like least about Northland Science Discovery and why:**

- **WLSSD - it smelled really bad! (10)**
- **Not enough rec time.**
- **Going to bed early because I'm not used to it.**
- **Didn't get to swim at Gooseberry.**
- **No medicine related projects.**
- **Having to go to meals with counselors. (2)**
- **Not being able to go to the gym & computer lab when we wanted to.**
- **Capture the Flag game - SUMS was too rough.**
- **Geology class - wasn't that interesting.**
- **Omnitheathre - uninformative & drawn out.**
- **Wearing shirts on last day - I brought a dress to wear.**
- **Some of the SUMS people.**

6. Rate the following on a scale of 1 - 5:

Activity	A. Biology Class						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	1	6	9	9	25	4.04

Comments:
- Growing own bacteria was great.
- Genetics was a lot of fun. (2)
- Great.
- Learned a lot.

Activity	B. Chemistry Class						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total eacn rating	0	0	4	12	9	25	4.2

Comments:
- Paul's experiments were great.
- Penny experiment was fun.
- Great teacher. (2)
- I love watching things blow up.

Activity	C. Geology Class						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	4	2	5	7	7	25	3.44

Comments:
- Classes got long.
- Nice teacher.
- Learning how to use a compass was helpful.

Activity	D. Physics Class						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	0	2	5	18	25	4.64

Comments:
- Buzz is great.
- Well planned.
- Most I've ever learned about physics.
- Rockets rule.

Activity	E. Minnesota Zoo						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	1	2	4	18	25	4.56

Comments:

- **I love animals.**
- **Not enough animals. (2)**
- **More time. (2)**
- **Poetry was hard.**
- **Great. (2)**

Activity	F.Minnesota Scienc Museum						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	0	2	2	21	25	4.76

Comments:

- Lasers rock.
- Cool displays.
- Enjoyed, except omnitheatre. (2)
- More time.
- Liquid vision was really neat.
- Great. (2)

Activity	G. "Ride Physics"						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	0	3	4	18	25	4.6

Comments:

- Screaming eagle was the best.
- Not enough time.
- Best.
- Carousel & swings not that great.
- Fun. (3)
- Valleyfair next time.

Activity	H. Planetarium						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	2	3	9	10	24	4.13

Comments:

- Frankenstein is cool. (3)
- Pretty house. (2)
- Tour guide was great.
- Got zapped.
- Neat.

Activity	**M. Gee Whiz Night**						
Rating	Poor		Fair		Excellent		
Rating #	1	2	3	4	5	N	Mean
Total each rating	0	0	3	9	13	25	4.4

Comments:

- Pringle rockets were neat.
- I love it when things blow up.
- Teachers were great.
- Outstanding.
- Neat.

9. Anything else you would like to tell us:

- Leadership group made lots of noise (pounding on walls, blowing in intercom, walking in our room at midnight).
- I would surely come again no matter what.
- Thanks for the fun time.
- Very interesting to come here.
- I want to come back to SUMS.
- I had a really great time.
- This was a great opportunity for me! Thank you counselors, instructors, & Katie for being there for us.
- I learned a lot about myself & others through this program.
- Keep up good work.
- You've all been great for putting up with us.
- Really good food & activities.
- Fun except for T-shirts, open door rule, & early lights out. Thanks for everything.
- Good learning experience.
- Keep the camp going for years.

Name _____

NSD Program 1996
THE COLLEGE OF ST. SCHOLASTICA

SURVEY OF STUDENTS' MATH AND SCIENCE ATTITUDES--POST-TEST

	Strongly agree				Strongly disagree
1. Mathematics is something which I enjoy very much.	1	2	3	4	5
2. Science is something which I enjoy very much.	1	2	3	4	5
3. I would like to do some outside reading in mathematics.	1	2	3	4	5
4. I would like to do some outside reading in science.	1	2	3	4	5
5. Mathematics is helpful in understanding today's world.	1	2	3	4	5
6. Science is helpful in understanding today's world.	1	2	3	4	5
7. I usually understand what we are talking about in mathematics class.	1	2	3	4	5
8. I usually understand what we are talking about in science class.	1	2	3	4	5
9. It is important to know mathematics in order to get a good job.	1	2	3	4	5
10. Working with numbers upsets me.	1	2	3	4	5
11. It is important to know science in order to get a good job.	1	2	3	4	5
12. I like to play games that use numbers.	1	2	3	4	5
13. I am good at working science problems.	1	2	3	4	5
14. I remember most of the things I learn in mathematics.	1	2	3	4	5
15. I would rather be given the right answer to a mathematics problem than to work it out myself.	1	2	3	4	5
16. I would rather be given the right answer to a science problem than to work it out myself.	1	2	3	4	5
17. If I don't see how to work a mathematics problem right away, I work at it.	1	2	3	4	5
18. If I don't see how to work a science problem right away, I work at it.	1	2	3	4	5
19. You have to be smart to like science.	1	2	3	4	5
20. Learning science is important for both girls and boys.	1	2	3	4	5
21. Science experiments are fun.	1	2	3	4	5

The College of St. Scholastica
PLUS Center

NSD 1996
Results: Pre/Post Survey of Student's Science and Math Attitudes

Table 1. Summary of how each science question increased or decreased in rating between pre and post testing. Positive numbers show improvement of attitude, negative numbers show deterioration of attitude. Number of boys was 3, number of girls was 14. Results from three girls were removed because of scale reversal.

	Abbreviated Survey Question	Boys Total	Girls Total	Boys & Girls Total
1	I enjoy science	0	-4	-4
2	Like outside science reading	-3	-2	-5
3	Need science to understand world	-4	1	-3
4	Understand science class	-5	2	-3
5	Need science to get a job	1	0	1
6	Good at working science problems	-1	5	4
7	Wants right answer given in science	-3	0	-3
8	Works on science to get answer	-3	0	-3
9	Must be smart to like science	-5	4	-1
10	Science important for boys and girls	-3	2	-1
11	Science experiments are fun	1	0	1
	Total Differences	-25	8	-17

Table 2. 'Summary of how each math question increased or decreased in rating between pre and post testing. Positive numbers show improvement of attitude, negative numbers show deterioration of attitude. Number of boys was 3, number of girls was 14. Results from three girls were removed because of scale reversal.

	Abbreviated Survey Question	Boys Total	Girls Total	Boys & Girls Total
1	I enjoy math	4	-6	-2
2	Like outside math reading	2	-2	0
3	Need math to understand world	-1	-1	-2
4	Understand math class	-1	1	0
5	Need math to get a job	-2	-1	-3
6	Likes games with numbers	1	0	1
7	Working with numbers upsets	2	0	2
8	Remembers things learned in math	0	-1	-1
9	Wants right answer given in math	-5	-2	-7
10	Works on math to get answer	0	0	0
	Total Differences	0	-12	-12

NSD Program 1996
STUDENT SELF-ESTEEM SURVEY

		Strongly agree				Strongly disagree
1.	In high school I intend to take math every year.	1	2	3	4	5
2.	In high school I intend to take biology.	1	2	3	4	5
3.	In high school I intend to take chemistry.	1	2	3	4	5
4.	I intend to attend college.	1	2	3	4	5
5.	I intend to take math and/or science courses in college.	1	2	3	4	5
6.	I intend to have a career that uses math and/or science.	1	2	3	4	5
7.	I forget most of what I learn.	1	2	3	4	5
8.	I can give a good talk in front of my class.	1	2	3	4	5
9.	It is easy for me to do well in school.	1	2	3	4	5
10.	I often feel that I am doing badly in school.	1	2	3	4	5
11.	I get good grades if I want to.	1	2	3	4	5
12.	I like the teacher to ask me questions in front of the other students.	1	2	3	4	5
13.	I finish my school work quicker than the other students.	1	2	3	4	5
14.	I like school.	1	2	3	4	5
15.	I like doing homework.	1	2	3	4	5
16.	My classmates think I am a good student.	1	2	3	4	5
17.	It's easy for me to ask questions in class when I don't understand something.	1	2	3	4	5
18.	I am afraid of making a fool of myself.	1	2	3	4	5
19.	I enjoy working with others.	1	2	3	4	5

The College of St. Scholastica
PLUS Center

Northland Science Discovery 1996
Results: Pre/Post Survey of Student's Students' Self-Esteem

Table 1. Summary of how each question increased or decreased in rating between pre and post testing. Positive numbers show improvement of self esteem, negative numbers show deterioration of self esteem. Number of boys was 3, number of girls was 14. Results from three girls were removed because of scale reversal.

	Survey Question	Boys Total	Girls Total	Boys & Girls Total
1	In high school I intend to take math every year.	-1	5	4
2	In high school I intend to take biology.	0	-1	-1
3	In high school I intend to take chemistry.	0	3	3
4	I intend to attend college.	0	-4	-4
5	I intend to take math and/or science courses in college.	0	3	3
6	I intend to have a career that uses math and/or science.	0	-1	-1
7	I can give a good talk in front of my class.	1	5	6
8	It is easy for me to do well in school.	0	0	0
9	I get good grades if I want to.	0	2	2
10	I like the teacher to ask me questions in front of the other students.	1	1	2
11	I finish my school work quicker than the other students.	0	-7	-7
12	I like school.	0	-4	-4
13	I like doing homework.	0	0	0
14	My classmates think I am a good student.	0	-2	-2
15	It's easy for me to ask questions in class when I don't understand.	1	-2	-1
16	I enjoy working with others.	0	-2	-2
	Total Differences	**2**	**-4**	**-2**

The College of St. Scholastica
Duluth, Minnesota

PLUS Center

NSD - 1996 Reunion
Evaluation

1. Thinking back about Northland Science Discovery:

What I remember most about NSD is:

- The water balloon game against SUMS. (3)
- New friends.
- The trip to the Cities. (2)
- The restrictions were really annoying at first. Ok, all the time. But the counselors/instructors were great.
- Going to Camp Snoopy.
- Having fun in the dorms before and after 10pm. (2)
- Was all of the people and all of the fun activities we did.
- Volleyball games.
- That stupid "Recessa Annie" song.
- The dorms.
- My friends and the dorms.

The most important thing about NSD, for me, was:

- The interaction with science.
- Everything.
- Having fun, meeting people during science/math stuff.
- Leaving.
- Finding new and interesting people.
- Learning new things and meeting new people. (2)
- Meeting people.
- Learning all the things about science, having fun with all of my friends, partying.
- To make different friends.
- Playing volleyball.
- I decided to enter a field of science.
- Learning more about science.
- Learning.
- The research.
- The experiments.

2. Thinking about the reunion today:

a. What did you like the most about the reunion:

- It's a tie between the cameras and hot air balloons.
- Everything. (2)
- Camera time & talk time to gossip.
- Seeing my friends. (9)
- My delicious salad. Being able to leave lunch without permission.
- Developing the film.
- All of it, it was fun to learn something I didn't know about.
- Taking pictures.
- The balloons.

b. What did you like least about the reunion:

- The weather.
- Nothing.
- It was fun.
- No time to talk.
- Lunch - the hamburgers looked weird.
- Hearing about Tracy's letter.
- Gluing together the balloons. The bookstore was closed.
- Figuring out the hot air balloons.
- Everyone wasn't here.
- This survey. (2)
- Nothing. (3)

3. Evaluation of reunion activities:

Question	**a. Pinhole cameras**						
Rating	Not worthwhile		Moderate worthwhile		Really worthwhile		
Rating #	1	2	3	4	5	N	Mean
Total each rating			1	4	9	14	4.57

Tell us one thing you learned about light:

- It can mess up film
- It criss crosses through the pinhole.
- How to make cameras without paying a lot.
- I learned how negatives are opposite the picture.
- Travels in straight lines. (3)
- You can't develop film in light (has to be dark). (2)
- It's bright.
- It's cool.
- It's bright enough to develop pictures even when it's cloudy
- It exposes film.

Question	b. Hot Air Balloons						
Rating	Not worthwhile		Moderate worthwhile		Really worthwhile		
Rating #	1	2	3	4	5	N	Mean
Total each rating			2	5	9	16	4.44

Tell us one thing you learned about the physics of balloons!:

- They're hard to glue together.
- They have to be arrow dynamic. (2)
- Hole sinks it all.
- Balloons are fun to make.
- The folding results to an oval...so far.
- Hot air rises. (2)
- Hot air - it's cool.
- They can fill with air if sealed.
- They float.
- How hot air balloons are designed.
- How to make them with paper.
- How to make them.

Question	Overall, how would you rate the reunion:						
Rating	Not so great		Okay		Totally awesome!		
Rating #	1	2	3	4	5	N	Mean
Total each rating			1	5	10	16	4.56

Any suggestions about how the day could have been better:

- Open the bookstore. (2) Nap time.
- No.
- Have more time to talk.
- Not so much diet pop.
- Let us talk and visit more.
- More food.
- Everyone here, but that can't be helped.

Any general comments about PLUS Center programs:

- Great.
- They're fun and great.
- Definitely continue.
- Keep it up, please.
- It's cool. (2)
- Good stuff.
- I still don't like Katie.
- This is a wonderful program.
- This was great.

APPENDIX D

Parent Survey

THE COLLEGE OF ST. SCHOLASTICA
Duluth, Minnesota

PLUS Center
Northland Science Discovery - 1996

SURVEY OF PARENTS' MATH AND SCIENCE ATTITUDES

Gender: Females 16, Males 4, Total 20
Relation to student: Mother 16, Father 4

	FREQUENCY Strongly Agree → Strongly Disagree					N	Mean
	1	2	3	4	5		
1. Mathematics is something I enjoy very much.	6	2	9	1	1	19	2.42
2. Science is something which I enjoy very much.	11	4	4	1	0	20	1.75
3. Mathematics is helpful in understanding today's world.	14	5	1	0	0	20	1.35
4. Science is helpful in understanding today's world.	18	2	0	0	0	20	1.10
5. I usually understood what we were talking about in mathematics classes.	6	5	7	0	2	20	2.35
6. I usually understood what we were talking about in science classes.	9	6	3	2	0	20	1.90
7. My mathematics teachers made mathematics interesting.	5	4	4	5	3	21	2.86
8. My science teachers made science interesting.	4	8	3	5	0	20	2.45
9. I would like a job which doesn't use any mathematics.	0	0	5	7	8	20	4.15
10. I would like a job which doesn't use any science.	0	0	3	7	10	20	4.35
11. I like to play games that use numbers.	5	10	4	1	0	20	2.05
12. I am good at working science problems.	6	7	7	2	0	22	2.23
13. I would rather be given the right answer to a mathematics problem than to work it out myself.	0	1	4	5	10	20	4.20

14. I would rather be given the right answer to a science problem than to work it out myself.	0	1	3	5	10	19	4.26
15. The only reason I took mathematics was because I had to.	1	3	3	6	7	20	3.75
16. The only reason I took science was because I had to.	1	4	3	5	7	20	3.65
17. Mathematics is more of a game than it is hard work.	7	2	6	3	1	19	2.42
18. Science is more of a game than it is hard work.	6	6	3	4	1	20	2.40
19. I had, and still have, a real desire to learn mathematics.	6	6	6	2	0	20	2.20
20. I had, and still have, a real desire to learn science.	8	7	3	2	0	20	1.95

Adults the camper lives with: Two parents 15, Mother only 5, Father only 0, Other 0

Educational Level	Father	Mother
a. Not high school graduate	0	0
b. High school graduate or GED	5	3
c. One or more years of post-secondary education	4	9
d. Undergraduate degree	4	2
e. Some graduate education	0	3
f. Master's degree	2	1
g. Degree beyond the master's degree	0	0

APPENDIX E

Camp Staff Evaluation

The College of St. Scholastica
Duluth, Minnesota

PLUS Center
Northland Science Discovery
July 8 - August 2, 1996

CAMP STAFF EVALUATION

Selection Process

- Hard to have the mixture in grades and different school curriculum because some kids had had geology or chemistry others had had none; Difficult to keep the ones who had it interested while getting others up to speed
- Worked out having more 8th and 9th graders than 10th
- Hard to tell motivation and experience of student from application
- It would be good to go back over the applications of the ones we chose to see how they fit with the student. In one case the teacher recommendations did not sound at all like the kid that was in camp. Is there a better way to get at who these kids are in the application process?

Program Structure

- Classes and field trips well organized
- Worked out to give students computer assignments and to let them do it at their own speed because of the differences in ability. Those who were more computer savvy and finished the assignment quickly could go on to other actives or assist the students who had less experience.
- Time off for prep time was arranged well
- Switching research groups mid-session worked out well. Worked more intimately with more of the kids, felt the kids got more out of the program.
- Need to start computer lessons before research. Try to have computer lesson earlier in the day
- Try to organize research computer time better, maybe a sign-up. Good to have the computer instructor be so flexible.
- Good balance of classroom time to research time

Class and Research

- Computer work excellent. Very impressed with use of presentation software.
- Chemistry research a little difficult because most have had no classes yet. To do the nuts and bolts and keep it fun and hands-on is a tough balance and some students remain somewhat in the dark which showed in the final presentation.

Field Trips

- Coach bus for city travel was a good thing, but would like separate vehicles for instructors
- The kids can't stand the treatment plant. Good for them to go there. Need to work on the presentation and follow-up otherwise all they remember is the smell. Visit the Superior Plant instead of the Duluth Plant. It smells less.
- Try not to repeat activities from other camps and schools
- Twin Cities trip a great success. Ride Physics at the Mall of America mall worked well
- Great field trips.

Other Comments

- Very smart group of kids, very bright, more intellectually more together
- Great group of counselors, a reasonable group. Good to have a male counselor, provided good role model to the small group of boys in the camp
- Great to see the kids who are terrified of doing the final presentation up on the stage doing a fine job. Seems to be a great confidence builder.
- Try not to favor those who have experience
- They were basically good kids but frustrated by short attention span of students and lack of respect/manners, the testing that goes on with this age group.
- Need to give more direction without being so rule-oriented
- Was surprised by the lack of desire on students part to be outside. We had beautiful weather and kids would choose being inside over outside
- remove TV from student lounge
- Best NSD ever

Ideas for future programs

- 4 week program long. 2-3 better
- Shifting to an older group would be more beneficial because they have already had the classes, a more solid science base.
- Gear the program toward younger kids as they are more available to come because they don't have jobs yet and it is a good time to influence them
- Medical technology is big trend

APPENDIX F

Publicity

Herald-Review, Grand Rapids, MN, Wednesday, July 31, 1996

Bovey students participate in summer science program

Three students from Bovey are exploring different areas of scientific research at The College of St. Scholastica in Duluth.

They are: Knute Nix, son of Stanley and Mary Nix of Bovey; Maureen Robertshaw, daughter of Jim and Becky Robertshaw of Bovey; and Kelly Stish, daughter of Ed and Sue Stish of Bovey.

The students are participating in Northland Science Discovery, a four week residential program for students entering grades eight through 10 in the fall. The program runs July 8 - Aug. 2 and the students stay on the St. Scholastica campus, returning home on weekends.

The program's participants come to St. Scholastica from throughout Northeastern Minnesota and Northwestern Wisconsin. They are selected on the basis of their interest in science, letters of recommendation from their teachers and academic performance.

Knute Nix

Maureen Robertshaw

Students attend innovative classes and field trips in earth science, geology, biology, chemistry and physics. They design and conduct experiments, collect data, use computers to analyze their findings and make a final presentation. The field trips include geology hikes on the Gooseberry River, hands-on activities at the Environmental Protection Agency's Duluth water lab and a trip to the Twin Cities to do amusement park physics, visit several museums and take in the Minnesota Zoo.

Northland Science Discovery is a project of St. Scholastica's PLUS Center. PLUS stands for Promoting Learning Among Underrepresented in Science and is funded by a federal Eisenhower grant and the Department of Energy. The PLUS Center works with the region's school districts, scientists and professional organizations to promote learning and leadership among those students traditionally underrepresented in science and math.

Adam Mazurk (left) of Cook doing field work at Boulder Lake.

Cook students exploring scientific research

Two students from Cook are exploring different areas of scientific research at The College of St. Scholastica in Duluth. They are Adam Mazurk, son of Paul and Michelle Mazurk of Cook, and Michelle Miskowitz, daughter of Gerald Miskowitz and Charlene Hanson of Cook.

The students are participating in Northland Science Discovery, a four-week residential program for students entering grades 8 through 10 in the fall. The program runs July 8 - Aug. 2 and the students stay on the St. Scholastica campus, returning home on weekends.

The program's participants come to St. Scholastica from throughout Northeastern Minnesota and Northwestern Wisconsin. They are selected on the basis of their interest in science, letters of recommendation from their teachers and academic performance.

Students attend innovative classes and field trips in Earth science, geology, biology, chemistry and physics. They design and conduct experiments, collect data, use computers to analyze their findings and make a final presentation. The field trips include geology hikes on the Gooseberry River, hands-on activities at the Environmental Protection Agency's Duluth water lab and a trip to the Twin Cities to do amusement park physics, visit several museums and take in the Minnesota Zoo.

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Cloquet Journal

August 2, 1996

Young local students study scientific research at College of St. Scholastica

Three Cloquet students are exploring different areas of scientific research at the College of St. Scholastica, Duluth, Minn.

They include Theresa Christian, daughter of Lawrence and Marge Peterson of Culver; Nicholas Elias, son of John and Nancy Elias of Cloquet; and Rebecca Helland, daughter of Byron and RoxAnne Helland, Cloquet.

They are participating in Northland Science Discovery, a four-week residential program for students entering grades 8 through 10. The program runs July 8 - August 2, and the students stay on the St. Scholastica campus, returning home on weekends.

Program participants come to St. Scholastica from throughout northeastern Minnesota and northwestern Wisconsin. They are selected on the basis of their interest in science, letters of recommendation from their teachers, and academic performance.

Students attend innovative classes and field trips in earth science, geology, biology, chemistry, and physics. They design and conduct experiments, collect data, use computers to analyze their findings, and make a final presentation. Field trips include geology hikes on the Gooseberry River, hands-on activities at the Environmental Protection Agency's Duluth water lab, and a trip to the Twin Cities to do amusement park physics, visit several museums, and take in the Minnesota Zoo.

Northland Science Discovery is a project of St. Scholastica's PLUS Center for promoting learning among the underrepresented in science and is funded by a federal Eisenhower grant and the Department of Energy.

Duluth Budgeteer

August 25, 1996

Cassandra McKay, Leah Maher, and Elizabeth Andert doing field work in Boulder Lake.

DULUTH STUDENTS EXPLORED SCIENTIFIC RESEARCH THIS SUMMER AT ST. SCHOLASTICA

Eight students from the Duluth area explored different areas of scientific research at The College of St. Scholastica in Duluth.

Emily Alberio of Saginaw, Elizabeth Andert of Duluth, Becky Christian of Duluth, Melyssa Hansen of Duluth, Cheryl Hindermann of Duluth, Cassandra McKay of Kelsey, Aurora Vogt of Duluth, and Alexandra von Weurth-Hart of Mahtowa participated in Northland Science Discovery, a four-week residential program for students entering grades 8 - 10 in the fall.

The program's participants come to St. Scholastica from throughout northeastern Minnesota and northwestern Wisconsin. They are selected on the basis of their interest in science, letters of recommendation from their teachers and academic performance.

Students attend innovative classes and field trips in Earth science, geology, biology, chemistry and physics. They design and conduct experiments, collect data, use computers to analyze their findings and make a final presentation. The field trips include geology hikes on the Gooseberry River, hands-on activities at the Environmental Protection Agency's Duluth water lab and a trip to the Twin Cities to do amusement park physics, visit several museums and take in the Minnesota Zoo.

Northland Science Discovery is a project of St. Scholastica's PLUS Center. PLUS stands for Promoting Learning Among Underrepresented in Science and is funded by a federal Eisenhower grant and the Department of Energy.

APPENDIX G

PREP Attendance Summary Sheet

U.S. Department of Energy
PREP
Attendance Summary Sheet
1996 - 1997

To be Filled out by the Project Director Date: 5/15/97

College or University: The College of St Scholastica

Project Director: Ann Sigford

Grant Number: DE-FG02-95TE00041

1. Length of Summer Program: 20 days

2. Total Number of Academic Year Days Included: 1

3. Number of Class Hours: 45 , Laboratory Hours: 45 , Field Trip Hours: 56

4. Number of Applicants: 41

5. Number of Participants: Summer: 25 Academic Year: 16

6. Number of Participants by Grade Level: 6th 0 7th 0 8th 16 9th 8
   10th 1

7. Number of Female Participants: 20
   American Indian 1 Asian 0 Black 1 Hispanic 1
   Caucasian 17 Alaskan Native 0 Pacific Islander 0

8. Number of Male Participants: 5
   American Indian 2 Asian 0 Black 0 Hispanic 0
   Caucasian 3 Alaskan Native 0 Pacific Islander 0

9. Number Enrolling in Science-based Program in Academic Year 25

APPENDIX H

FINANCIAL INFORMATION removed

Financial Status Report

Federal Cash Transactions Report

Request for Advance or Reimbursement

June 30, 1996 College of St. Scholastica, Inc. Audit