THE CAMILLE AND HENRY DREYFUS FOUNDATION, INC.
555 MADISON AVENUE
NEW YORK, NEW YORK 10022-3301
(212) 753-1760

10 August 1992

Dr. J. D. Andrade
Department of Bioengineering
The University of Utah
2480 Merrill Engineering Building
Salt Lake City, Utah 84112

Dear Dr. Andrade:

Thank you for your inquiry about support for establishing a science fax network for elementary school teachers. Your project may be suitable for consideration under the Camille and Henry Dreyfus Special Grant Program in the Chemical Sciences. You should exactly follow the guidelines for the complete proposal that are given in the enclosed program brochure. Please note that the page limit applies to the entire proposal. Appendices are not advised.

Although the Foundation recognizes the importance of science education in elementary schools, with limited funds we do not in general direct our attention to that level and to science as a general topic. In order for your proposal to be competitive, you will have to identify explicitly its chemistry component, which would form the basis of your request. Reviewers will also want to know how you will measure the network's success, and how you plan to sustain it. How interactions among the teachers themselves can be fostered would also be of interest.

Finally, reviewers will want to see evidence that you are seeking funds elsewhere for the project. Please note that an award from the Camille and Henry Dreyfus Foundation is not meant to supplant an expected institutional contribution.

As a reminder, the deadline for receipt of the complete proposal has been changed to 30 September 1992.

Sincerely yours,

Robert Lichter

Robert L. Lichter, Ph. D.
Executive Director

(2)

THE CAMILLE AND HENRY DREYFUS FOUNDATION, INC.
555 MADISON AVENUE
NEW YORK, NEW YORK 10022-3301
(212) 753-1760

12 February 1

copy to F. G. Office

Dr. Arthur Smith
President
University of Utah
Salt Lake City, UT 84112

Dear Dr. Smith:

Re: Award No

I am pleased to enclose a check for $25,000 in payment of the Camille and H
Special Grant in the Chemical Sciences for 1993 to the University of Utah on
Joseph Andrade. We are pleased that the Foundation is able to play a role in

As a reminder, please note that financial and technical reports are due when
terminated or funds are expended. Processing will be facilitated if you refer
award number.

At your convenience, we should appreciate acknowledgement that you have
check.

With best wishes,

Sincerely yours

Robert L. Lichte
Executive Direc

cc: Dr. Joseph Andrade

The Center for
Integrated Science Education
(CISE)

Jan 15, 1993

Dr. Robert L. Lichter
Camille and Henry Dreyfus Foundation, Inc.
555 Madison Ave., Suite 1305
New York, NY 10022-3301
FAX: (212) 593-2256

Dear Dr. Lichter,

Thank you for your telephone call of Jan 14. You asked me to revise the ELEM-NET project budget to $25,000 for a 12 month period. I am confident that we can launch the project with this level of support by making the following adjustments:

- decrease funds allocated to faculty personnel (the participants are willing to donate their time and the institution will provide some faculty time),
- decrease mailing costs by using the intra-mail services of each of the school districts involved,
- decrease the number of Elem-Net newsletters to 7 for the first year of operation, and
- decrease the number of students involved from two to one.

A revised budget is attached. Please note that the institution, by allowing faculty to participate in this project without direct charge of their time, is making a significant contribution to the project. An additional contribution is via the waiver of the 47.5% overhead rate normally assessed to such projects.

We hope to raise additional funds locally via corporations and foundations committed to improving science education. The Dreyfus grant award will be very helpful in inducing the local companies and foundations to provide additional support.

Please let me know if you need further information. My colleagues and I, and Utah's elementary teachers, are eager to initiate this project.

Sincerely,

J.D. Andrade, Ph.D.
Professor

cc. F. Gillmor
cise/jan14

Catagory	Year 1 Mar, 1993-Feb, 1994
Personnel:	
J.D. Andrade	$2,000 (1 month)
J. Gess-Newsome (1/2 month)	$1,000
Other Faculty	$3,000
Secretary/Newsletter Editor	$5,000
Students	$6,000
Supplies	$2,000
Travel	$1,000
Other:	(7 Newsletters)
Printing	$3,000
Mailing	$1,500
Telephone	$500
Total Direct Costs:	**$25,000**
Total Requested:	**$25,000**

THE UNIVERSITY OF UTAH

Center for
Integrated Science Education (CISE)

Dr. Robert L. Lichter
Camille and Henry Dreyfus Foundation, Inc.
555 Madison Avenue, Suite 1305
New York, NY 10022-3301

September 7, 1993

Dear Dr. Lichter:

Following up on our recent telephone conversation I am pleased to submit our continuation proposal to the Special Grant Program in the Chemical Sciences.

The project is titled: Elem-Net: Enhancing the Chemistry Experience in Utah Elementary Schools, a Model Project. Please recall that the project was submitted last year requesting approximately $70,000 for a two year initiation effort. The Foundation offered to fund the project at a $25,000 level for a one year feasibility study with the suggestion that a second year of support might be provided once initial feasibility was demonstrated.

A significant part of the budget in the original proposal dealt with mailing and distribution costs and printing costs. By decreasing the number of issues, changing the distribution mechanism, and obtaining local support and contributions, we have been able to initiate the project statewide with a greatly reduced budget. It has met with an enthusiastic response from the elementary education community. We look forward to completing the first full year of operation.

In order to fully assess the impact and effectiveness of the project, and to extend it to the intermountain region beyond Utah's immediate borders, second year support is needed. The enclosed proposal documents those needs and requests support at a very modest level. The proposal also indicates how we expect to have the project largely self supporting at the conclusion of the two years of Dreyfus support.

My colleagues and I, and the region's elementary teachers, students, and parents, are eager to fully develop this initiative and to put it on a firm, permanent technical and financial footing. We certainly appreciate the Camille and Henry Dreyfus Foundation's interest and support.

Please let me know if you need any further information.

Sincerely,

J.D. Andrade, Ph.D.
Professor and Director

cc: F. Gillmour, Development Office
M. McDonald, Project Coordinator

cise/sept3

Department of Bioengineering
2480 Merrill Engineering Building
Salt Lake City, Utah 84112
(801) 581-8528
FAX: (801) 585-5361

Camille and Henry Dreyfus Foundation, Inc.
Special Grant Program in the Chemical Sciences

Progress Report:
February 12 to September 3, 1993

Award #: SG-93-060

To: University of Utah
Center for Integrated Science Education
2480 MEB, Salt Lake City, Utah 84112
(801) 581-4379

Project Director: J.D. Andrade, Ph.D.

Title: Elem-Net: Enhancing the Chemistry Experience in Utah Elementary Schools, A Model Project

Project Summary:

Elementary teachers tend to feel insecure and even afraid of scientific and technical topics, particularly chemistry. Their fears and hesitancies are directly transmitted to their students. We propose to directly communicate with every individual elementary school teacher in Utah, nearly 500 schools and over 10,000 teachers,via a newsletter/newspaper with ideas, encouragement, and resources involving chemistry-based topics, experiments, and projects in the classroom and in the home.

Background:

The Project was initiated on February 12, 1993 with the award notice and check for Grant SG-93-060 for $25,000. The initial proposal was for a two year project at a level of $70,000. The Foundation offered to provide one year of support at the $25,000 level, with the suggestion that a second year of support would be considered if the project were successfully initiated and considered effective. We have launched the project and have established its effectiveness. A second year of support is requested in the companion proposal.

Rationale:

The typical elementary teacher has weak science, mathematics, and technology backgrounds and very limited experience in these areas. Even worse, the limited experience and background they do have was often obtained under conditions and situations which led to the development of a fear, anxiety, or feeling of personal incompetence in scientific and technical areas. This has a lot to do with how science and mathematics are taught to non-science students in colleges and universities. Although there are major programs, initiatives, and activities to enhance science and mathematics education for all students in colleges and universities, we have the major problem that a very large number of currently practicing inservice elementary teachers have not had the benefits of the recent improvements in undergraduate science education.

The Center for Integrated Science Education (CISE) at the University of Utah was founded several years ago specifically to focus on the practising elementary teacher. We have developed a set of activities and programs targeted to those individuals to improve their comfort level, skills, content knowledge and general attitude toward and confidence in science and mathematics. Although there are many national, regional, and local programs for high school and even middle school teachers,(workshops, summer institutes, and related activities,) the elementary school teacher is largely ignored. It is our interest and commitment to focus on this population.

Initiation:

The project was formerly launched on February 12, 1993. Mary McDonald assumed the responsibility for the day to day direction of the Elem-Net project under the supervision of J.D. Andrade, Director of the Center for Integrated Science Education. They recruited several undergraduate student volunteers, key faculty in chemistry and chemical engineering, and selected staff with strong interest and effective track records in public science education. By working closely with the Science Coordinator's Office in the Utah State Office of Education and with the Utah Association of Elementary School Principals, as well as with the Utah Education Association (a major professional organization for elementary school teachers in the State), efforts were initiated to inform the elementary teacher and principal population of the Elem-Net project, and to prepare them for receiving Elem-Net activities.

Through the Principals organization a simplified but highly effective distribution mechanism was developed, which significantly decreased the distribution costs, a major component in the original budget.

EXPLORE!:

The major single activity of the Elem-Net project is the development and distribution of our ***EXPLORE!*** Newsletter. The goal is to have a short, succinct, informative, highly useful publication which the teacher can quickly and easily digest, and which provides the inspiration, the kick, the catalyst, the motivation to do chemistry and other science activities in the classroom. ***EXPLORE!*** is intentionally kept simple, short and non-glitzy. It is not printed in color and it is not on glossy paper, which not only keeps the cost down, but more importantly, treats the teachers as serious professionals. Much elementary teacher material is written as if it is for elementary students rather than for degreed professionals and adults. Nevertheless, it is written to be extremely easy to read, motivating, attractive, and highly practical.

Our inaugural issue of April, 1993 and the first issue for the '93-'94 academic year are enclosed as Appendix 1. Each issue consists of a hands-on activity which can be performed in the classroom by the students as well as by the teacher using very common everyday materials generally found in typical kitchens or bathrooms. There are also important news articles of a professional nature. In our inaugural issue, for example, there was a brief write-up on the evolving national science standards. Sources of information, resources, and related information are also included. Each issue profiles teachers and lists awards and other professional honors and recognition. Each issue also includes a particular contest or award that especially active and effective teachers and their classrooms can utilize.

Probably the most important component of each issue is the University Faculty Network, a key part of the overall Elem-Net project. In the first issue we called it Talk Chemistry, profiling Noel deNevers and Ron Ragsdale, two professors at the University of Utah who have received teaching awards and are well recognized for their efforts in enhancing chemistry education. The teachers are encouraged to communicate with these individuals as professionals, to call them with particular questions and inquiries. You will note that their home numbers are also published. Teachers are in their classrooms from about 8:00 to 3:00 daily and really the only time they have to prepare is at home in the evening or on weekends. An 8:00 to 5:00, Monday through Friday, phone number really does not do them very much good. Fortunately, our dedicated faculty participants have been willing to accept this increased burden.

Note that in issue #2, the first issue of the '93-'94 year, which is now being distributed, features two physics professors. Biology will be next, followed by mathematics. By then we will have talked two additional chemistry colleagues into lending their names, photos, and phone numbers.

Each issue includes a cumulative listing of the experts to whom the teachers have been introduced through ***EXPLORE!*** and who are available for questions and consultation. Our sincere hope is that these individuals will be badgered incessantly by elementary school teachers. In practice, however, this really doesn't happen. The number of calls is not excessive, and it is not an undue burden. But the very fact that the teachers know that they have the opportunity to call someone at the University who is willing to speak to them as a professional in language that they can understand, and that such a resource list is available, coming to them nearly every month in the ***EXPLORE!*** newsletter, provides a security factor and a foundation upon which they can begin to build a firm background and self confidence in chemistry and the other sciences.

We distributed the first issue of ***EXPLORE!*** by mailing or hand delivering it to each elementary school principal in the State with a "Dear Colleague" cover letter explaining the project and asking the principal to distribute ***EXPLORE!*** to each of the teachers, aides, substitute teachers, and resource people in that particular school. We have begun to receive calls from junior high school teachers who are disappointed that they are not on the distribution list, and we of course add them to the list on an individual basis.

By cutting the size of ***EXPLORE!***, cutting the number of issues, and mailing the copies to the schools, rather than to the teachers individually, we have been able to keep the cost of printing and distribution to about $1,500 per issue. This of course does not include any writing, layout, or other labor and production costs.

Publicity:

If the teachers have already heard about ***EXPLORE!*** and the Elem-Net project they will of course be more receptive and read it and utilize it more seriously. To be sure that no feathers were unduly ruffled in the public education community in Utah, we initiated the project with a brief announcement and discussion at the Utah Association of School Superintendents meeting last Spring. By distributing the inaugural newsletter to these individuals at *their* annual conference, and engaging them in a give and take dialogue about the project and its benefits, we had the superintendents' support from the very beginning. We will continue to have a presence at their annual meetings and have short stories, articles, and interviews published in their own professional newsletter to keep the superintendents aware of and appraised of the Elem-Net project and other activities of the Center for Integrated Science Education.

Early last Spring we met with the President elect of the Utah Association of Elementary School Principals (UAESP)and with his executive director and received their approval and endorsement of the project, which they then made known to their members. The principals thus knew about ***EXPLORE!*** before receiving the ***EXPLORE!*** mailings in their offices. We are on the program for the UAESP meeting in January of 1994, in which we will have a dialogue and panel discussion with Utah's elementary school principals.

We have worked with the Utah Science Teachers' Association so that the high school science teacher population does not feel in any way threatened or out of the loop. We have made presentations at the annual Utah Rural Schools Conference. We will be displaying at the Utah Education Association meeting in early October of this year.

We also distribute ***EXPLORE!*** to all individuals in the Utah System of Higher Education who have an interest in science education and teacher training. These include the various schools of education and science in the various colleges and universities in the system.

Other Support:

With the Dreyfus initial award in hand, we were able to obtain a small grant from US West to subsidize one issue. The Michael Foundation, a local philanthropic group, provided funds for several of our contest activities. We have also received some small support from the American

Chemical Society's Division of Polymer Chemistry for incorporating polymer and macromolecule-related topics in the ***EXPLORE!*** newsletter and Elem-Net project.

Other avenues of support planned for the long-term financial viability of the Elem-Net project are discussed in the accompanying continuation proposal to the Camille and Henry Dreyfus Foundation.

Assessment and Evaluation:

Since we have put out only one issue, the inaugural issue in April of 1993 towards the conclusion of the '92-'93 academic year, it is a bit early to say anything definitive regarding impact and efficacy of this project. By January, 1994 we will have three issues disseminated and will begin to assess the response and effectiveness. This will be done largely by a set of student volunteers. We will randomly select 5%-10%, depending on the number of volunteers and time available, of Utah's elementary schools and directly call the principal to be sure that he or she has received the Elem-Net packets and to assess their recognition of the project, their responsiveness, and their general attitude.

We also plan in the first 1994 issue to make available $25 of science supplies and materials to each of 20 classrooms who submit a letter summarizing the activities in the various ***EXPLORE!*** newsletters and providing their class plans for the use of the $25 credit. Admittedly, this will reward and provide input from the more active teachers and classrooms.

At the UAESP meeting in January of 1994 we will directly poll and briefly interview each of those principals with whom we interact at that meeting.

Admittedly, these are preliminary and not very scientific or objective measures of assessment and efficacy, nevertheless they will provide considerable input and direction to the project. One might think that a simple, short questionnaire to each of the 10,000 plus elementary school teachers would be the most effective way to accomplish this, but our experience suggests that teachers receive so many requests for that kind of input that most questionnaires and survey materials, either by mail or by phone, are ignored.

We will also be monitoring the number of telephone and mail inquiries regarding ***EXPLORE!*** and the Elem-Net project to provide some indication of the level of impact and of interest.

We have also asked the University of Utah's Public Relations Department to utilize its PR clipping service to provide us with copies of any and all references to ***EXPLORE!***, the Elem-Net project, and the Center for Integrated Science Education in regional newspapers and other publications.

Summary:

The project is well under way. In fact, in the initial proposal we said that we would develop a prototype newsletter during the Summer of 1993. We were able to develop our staff and student volunteer effort very rapidly and indeed produced our first issue in April, 1993. We used the Summer to put together ideas for the '93-'94 issues.

Our present budget should enable us to operate through about April of 1994, but that is still early for the project to be on a solid professional and financial footing. We request a second year of Dreyfus Foundation support to permit the project to continue through April of 1995. With that level of commitment we are confident in developing a mechanism in which the Elem-Net project could be continued indefinitely. The companion proposal discusses those topics and plans in greater detail.

THE CAMILLE AND HENRY DREYFUS FOUNDATION, INC.
555 MADISON AVENUE
NEW YORK, NEW YORK 10022-3301
(212) 753-1760

DOROTHY DINSMOOR, PRESIDENT
JOHN R. H. BLUM, VICE PRESIDENT
EDWARD A. REILLY, SECRETARY-TREASURER

EXECUTIVE DIRECTOR
ROBERT L. LICHTER

16 September 1993

Dr. Joseph D. Andrade
Center for Integrated Science Education
The University of Utah
2480 MEB
Salt Lake City, Utah 84112

Dear Dr. Andrade: Re: Award No. SG-93-060

Thank you very much for the progress report on your Camille and Henry Dreyfus Foundation Special Grant in the Chemical Sciences. We're glad to learn that the project is off to such an intense start. If the information is available, some estimate of the numbers of teachers who see the newsletter might be useful, unless the 10,000 figure in the report represents that number.

If available, I would like to receive ten copies of each of the two newsletters that you included with the report. Also, I would appreciate it if you would arrange for a financial report to be sent.

With best wishes for your continued progress,

Sincerely yours,

Robert L. Lichter

Robert L. Lichter, Ph. D.
Executive Director

THE UNIVERSITY OF UTAH

Center for
Integrated Science Education (CISE)

October 7, 1993

(2)

Robert L. Lichter, Ph.D.
Executive Director
Camille & Henry Dreyfus Foundation
555 Madison Avenue
New York, NY 10022-3301

Dear Dr. Lichter:

Thank you for your letter of September 16 regarding Award #SG-93-060, and our recently submitted second year proposal. I apologize for the delay in responding due to a hectic travel schedule.

Enclosed are 10 copies of each of the two newsletters. Newsletter #3, which is focusing on science of food, with an emphasis on chemistry, is now in the final design process and will be ready for distribution in about two weeks.

Our print run for the first two newsletters was about 11,000 but that will have to be increased in subsequent newsletters. There are nearly 12,000 elementary school teachers in the state of Utah, and that does not include middle school or high school, of course. We are starting to get a large number of inquiries from middle school teachers who want to be on the distribution list. We will also be formally distributing the newsletter to all principals and to all district superintendents, which will add another 1,000 or so.

We have prepared a summary financial report for the year 1993 and anticipated expenditures through February 28, 1994.

Please let me know if you need any further information.

We look forward to continuing to work with you and your co-workers in enhancing chemistry awareness and education in the United States.

Sincerely,

J.D. Andrade, Ph.D.
Director, CISE

cc: F. Gillmor, Development Office

cise/oct4

Department of Bioengineering
2480 Merrill Engineering Building
Salt Lake City, Utah 84112
(801) 581-8528
FAX: (801) 585-5361

THE UNIVERSITY OF UTAH

Center for Integrated Science Education

Summary Financial Report
Dreyfus Foundation Grant
SG-93-060
March 1, 1993 through February 28, 1994

Category	*Budgeted*	*Expenditure through 8/31/93*	*Anticipated Expenditures through 2/28/94*	*Difference*
Salaries & Benefits:	$17,000	$12,300	$4,700	___
Travel:	$1,000	$750	$250	___
Supplies:	$2,000	$1,400	$600	___
Other (printing, mailing, phone):	$5,000	$2,800	$2,200	___
Total:	**$25,000**	**$17,250**	**$7,750**	___

Department of Bioengineering
2480 Merrill Engineering Building
Salt Lake City, Utah 84112
(801) 581-8528
FAX: (801) 585-5361

THE CAMILLE AND HENRY DREYFUS FOUNDATION, INC.
555 MADISON AVENUE
NEW YORK, NEW YORK 10022-3301
(212) 753-1760

26 January 1994

Dr. Joseph Andrade
Center for Integrated Science Education
The University of Utah
2480 MEB
Salt Lake City, UT 84112

Dear Dr. Andrade:

Re: Proposal Number **SG-94-005**

It is a great pleasure to inform you that the Board of Directors of the Camille and Henry Dreyfus Foundation has approved your proposal submitted to the Camille and Henry Dreyfus Special Grant Program in the Chemical Sciences for 1993 in the amount of $20,000. An announcement of the awards and a statement of the terms and conditions of the award are enclosed. To activate the award, we will need to receive the latter statement signed by an appropriate institutional representative. Because the amount awarded is less than that requested, the award is contingent upon written assurance that the project can still be carried out substantially as proposed, or that remaining funds required to carry out the project will be made available from institutional or other sources. Thereafter, a check for $20,000 will be sent to The University of Utah for support of the project.

Please note the requirement of annual progress reports. These reports are a vital part of the Foundation's assessment of its programs, and should include an appraisal of the role that the award played in the project's accomplishments.

Selection of the awards was not a simple task owing to the high quality of so many of the 121 proposals. The Camille and Henry Dreyfus Special Grant Program in the Chemical Sciences is designed to encourage and respond to opportunities that can result in innovative ways to advance the chemical sciences, especially those efforts for which other sources of funding may not generally be available.

Please accept our congratulations and best wishes for your continued success.

Sincerely yours,

Robert Lichter

Robert L. Lichter, Ph. D.
Executive Director

A Proposal to the
Special Grant Program in the Chemical Sciences
The Camille and Henry Dreyfus Foundation, Inc.

555 Madison Ave., Suite 1305
New York, NY 10022-3301
(212) 753-1760

ATTN: Robert L. Lichter, Ph.D., Executive Director

Title:

ELEM-NET: Enhancing the Chemistry Experience in Utah Elementary Schools: A Model Project.

Summary:

Elementary teachers tend to feel insecure and even afraid of scientific and technical topics, particularly chemistry. Their fears and hesitancies are directly transmitted to their students. We propose to directly communicate with every individual elementary school teacher in Utah (nearly 500 schools and over 10,000 teachers). The ***EXPLORE!*** newsletter will contain ideas, encouragement, and resources to permit the use of chemistry-based topics, experiments, and projects in the classroom and at home.

The project was awarded one year funding in February, 1993 at a level of $25,000, with the suggestion that a second year of support would be considered. This proposal requests the second and final year of support. With such support we will produce ***EXPLORE!*** through the 1994-95 school year, develop long-range funding for the project, and expand the distribution to the rural communities bordering Utah.

Amount Requested:

$21,000

Project Director:

Joseph Andrade, Ph.D., Director
Center for Integrated Science Education
2480 MEB
University of Utah
Salt Lake City, UT 84112
(801) 581-4379; (801) 585-5361 FAX

Institutional Information and Endorsement:

University of Utah, Salt Lake City, UT 84112
Arthur Smith, Ph.D., President
Richard Koehn, Ph.D., Vice President for Research
Michael Mattson, Vice President for Development

Authorized Signatures:

J.D. Andrade
Project Director

Authorized Institutional Officer

Table of Contents

III. Project Description:

Most elementary teachers tend to have difficulty and insecurity with science and technological subjects (1). They sometimes begin projects (topics related to the environment and ecosystems, for example) but then abandon them. The further development of the topics often requires scientific background or depth which they simply do not have. Many teachers in more traditional schools and districts tend to teach only material which is specified in the core curriculum for that particular district or state (2). The teachers generally have difficulty in seeing the relationship between the required topics in the core curriculum and the local issues and events which tend to stimulate and motivate their students. In addition the teachers are often overburdened. Class sizes are too large. Teachers tend to feel that there is not enough time to incorporate many such topics in an average elementary classroom setting.

Elementary teachers' fears and anxieties about science are most pronounced in the chemical and physical sciences. Their own fears of chemicals are reinforced daily by a technically illiterate press which often exaggerates, misrepresents, and generally fuels the public's fears and anxieties towards chemicals and chemistry (3,4).

The American Chemical Society (ACS) and other groups have been very active in developing materials and resources to help address these problems (5). Most elementary teachers in Utah, for example, are not aware of the ACS Wonder Science program (5) or the fact that Wonder Science activities are now published in USA Today. Most elementary teachers are unaware of the National Science Teachers Association (NSTA) or even of the Utah Science Teachers Association (USTA). These organizations and curricula are generally well known among high school teachers, but not among most elementary teachers. Utah is not unique in this regard (5).

ACS and the Camille and Henry Dreyfus Foundation tend to focus their efforts and resources on the high school and college populations. There is a great need at the elementary level -- which is not being adequately addressed. A small investment in elementary level (K-6) chemical education will be very effective in developing a more chemically literate public and in stimulating students and teachers to further their knowledge of -- and experience in -- chemistry.

We propose a unique and novel program by which the Center for Integrated Science Education (CISE) at the University of Utah directly communicates with individual elementary teachers throughout the state of Utah via a newsletter presenting

issues. The professionally written and illustrated ***EXPLORE!*** newsletter contains tips, examples, and suggestions for classroom chemistry and chemical technology activities. Topics will include stories and controversies in local urban newspapers.

A major portion of the budget proposed is simply the costs involved in printing and delivering the newsletter directly to every elementary teacher . This direct communication and interaction has a number of major benefits . The most important is that the teacher no longer feels isolated in his/her classroom, but knows that someone, some group, is indeed interested in helping him improve his science and technology background and the chemical awareness in his classroom. We encourage feedback from the teachers. We encourage suggestions and input. We encourage class projects and a variety of other activities which get the students directly involved in the topics. We particularly encourage activities in which the students can take home some of their excitement and background, and thereby begin to educate the adult parent population. A very effective way to reach the general population is through its children.

Although ELEM-NET is initially an interaction between CISE and the individual teachers, as the project evolves the network will expand to include interactions between and among the teachers themselves, and between the teachers and the various scientific and technical professionals in their community.

We are working closely with a group of faculty at the University of Utah who are vitally interested in science and technical education. The faculty for ELEM-NET come from a range of chemical fields and departments, including chemistry, biology, materials science and engineering, biochemistry, bioengineering, and chemical engineering. Drs. Ron Ragsdale, Jerry Driscoll, Rick Steiner, Department of Chemistry, and Noel deNevers, Department of Chemical Engineering, are key participants in CISE, and are deeply involved in chemical education projects at many grade levels.

The major objective of the project is to produce ***EXPLORE!*** and deliver it directly to each elementary teacher. We have produced two issues with six more in preparation for the 1993-94 year. Please see Appendix 1 and the accompanying progress report. Other ongoing objectives include:

Objective 1: We are thoroughly familiar with the elementary education system in each of the state's school districts (6). The children of the 1.6 million people who live in this region are enrolled in various elementary schools in different school districts.

Objective 2: General science and technology education in most of the schools is limited at best, as is the case for much of elementary education in the United States (1). By communication with the school districts involved, and with the State Office of Education (7), we are assessing and learning about district initiatives for improving science, math, and technology education in the elementary environment.

Objective 3: We continue to survey elementary science, technology, and environmental education curricula, materials, and modules now becoming available at the elementary level; including the recent initiatives of the National Science Foundation, the National Science Teacher's Association, and other groups (5).

Objective 4: Topics, methods, and suggestions incorporated in ***EXPLORE!*** are carefully tied to state and district curriculum guidelines and assessment methodologies so that the teacher feels that these topics and activities are worthy of his/her effort, attention, and class involvement (2).

Objective 5: We include activities and projects which involve parents and guardians, and by this means educate and inform the parents as well as the students and the teachers.

Objective 6: We encourage the students and teachers to directly communicate with the CISE project office at the University of Utah, to have feedback and input regarding the level of activity, interest, and commitment (8).

Objective 7: We are assessing the results of the project by random surveys of the teachers and schools involved, and by random polling of various school officials, including principals, science curriculum supervisors, and PTA's or related organizations.

We certainly do not want to reinvent the wheel. We are carefully assessing those activities and projects related to chemical education which are now ongoing. One often finds a particular classroom or indeed a particular school which has innovative, unique, and often highly effective and successful science and environmental activities. As we learn of these successful initiatives, we will, with permission, incorporate them into this project, and do what we can to multiply and disseminate those successful activities. Given that the budgets for curricula materials and supplies in most of the schools involved are likely to be marginal at best, the tips and activities developed are consistent and compatible with those constraints.

One strategy for optimizing relevance of the topics to tie the tips and suggestions to current events, particularly issues and activities in the press which are of relevance and interest to the adult and student populations. We pay particular attention to those topics in which children tend to be highly motivated: music, sports, movies, television, etc.

The two issues of ***EXPLORE!*** produced and disseminated to date are included as Appendix 1, together with a brief brochure on the Center for Integrated Science Education.

By careful critique and input from the teachers, from the education administrators and supervisors, and from technical people with knowledge of the issues and problems , we will produce seven newsletters per academic year.

Each newsletter includes a response section encouraging the class and the teacher to contact CISE with information on their activities and their suggestions for future activities (8). These responses will be provided to the local press, with the hope and goal of encouraging them to do stories on the various classrooms and schools, in this way greatly magnifying the activity into the local community and thereby interesting parents, adults, and other teachers and encouraging their own participation in related activities. We will also do what we can, given the resources available, to encourage participating teachers and administrators to inform their local associations and groups of these activities, thereby further encouraging and enhancing the dissemination of these topics and projects.

The results of the first full year of activity (Summer, 1994), will be presented nationally at meetings, such as the National Science Teachers Association and the American Chemical Society (Division of Chemical Education), and submitted to national publications involved with elementary science education.

IV. Project Significance:

1)- Every elementary teacher and principal in each of the nearly 500 elementary schools in Utah will become much better informed and aware of chemistry and chemical technologies.

2)- Every elementary teacher in the state will receive seven times per year, the brief, practical, and helpful ***EXPLORE!*** newsletter, which encourages him/her to involve their students in chemistry topics and projects. The projects suggested are also of relevance and interest to parents and encourage students to take the topics and activities home to share with their parents.

3)- ***EXPLORE!*** includes a variety of tips and suggestions relating to the development of science projects and the development and enhancement of science fairs, which are not now common in elementary schools in Utah.

4)- ***EXPLORE!*** and its distribution network encourages teachers to communicate with each other and with the University faculty, staff, and students associated with the Center for Integrated Science Education (8). The teachers developing a network of individuals who can support and aid them in their science education endeavors.

5)- The project will serve as a national model for chemical sciences awareness by elementary teachers, students, and parents.

V. Resources

Our major resources are the Center for Integrated Science Education; the Departments of Chemistry and Chemical Engineering and allied departments at the University of Utah and other local institutions (Brigham Young University, Utah State University, Southern Utah State University, Weber State University, and Westminister College); the State Office of Education; the Utah Alliance for Science, Math, and Technology Education; and the local chapters of the American Chemical Society and the American Institute of Chemical Engineers.

We have obtained a small grant ($10,000 over 3 years) from the ACS's Division of Polymer Chemistry to help develop ELEM-NET with particular focus on polymers. We received a small grant from the local Michael Foundation to help with science contest activities.

Our major resource, however, is the dedicated people involved in this project: J. Andrade, Julie Gess-Newsome, Ron Ragsdale, and Noel DeNevers.

Joe Andrade, Project Director, is professor of Bioengineering, of Materials Science and Engineering, and of Pharmaceutics at the University of Utah and is the former Dean of the College of Engineering (1983-87). Several years ago Joe became increasingly interested in the issue of science education for the general population. While in graduate school Joe taught high school general science, biology, and chemistry in a parochial high school in Denver.

Joe recently decided to devote a significant portion of his time and career to the area of science education. He recently established the Center for Integrated Science Education at the University of Utah, and is working to involve all faculty, staff, and interested graduate students on campus with interests in science education.

He is an accomplished scientist and engineer with 5 books, over 100 peer reviewed research papers, and 5 patents. His research group focuses on proteins at interfaces, proteins as engineering machines and devices, and surface and interfacial chemistry.

Dr. **Julie Gess-Newsome** is a science educator whose focus is the science understandings of preservice and inservice elementary teachers. Julie's interests in these topics have been stimulated by her eight years of experience as a high school biology teacher.

Dr. **Ronald Ragsdale** is professor of Chemistry at the University of Utah, and has received many honors as an outstanding science and chemistry educator. He has a long history and successful track record in offering inservice and related courses for teachers and is known nationally for his activities in the area of chemistry education. He gives the annual series of Christmas Lectures at the University of Utah, which are in very high demand with standing-room only crowds, where he emulates the famous chemist and physicist, Michael Faraday, in giving popular scientific lectures with dramatic chemical demonstrations.

Dr. **Noel DeNevers** is professor of Chemical Engineering at the University of Utah. He has written a textbooks in fluid mechanics and edited a liberal education reader titled "Technology and Society". He has worked on a variety of local air pollution issues, has served on the Utah State Air Pollution Control Board and on the Governor's Clean Air Task Force, and is completing a book titled "Air Pollution Control Engineering". He is an absolutely outstanding teacher.

VI. Assessment and Evaluation:

Since we have put out only one issue, the inaugural issue in April of 1993, already towards the conclusion of the '92-'93 academic year, it is a bit early to say anything definitive regarding impact and efficacy of this project. The plan is very early in 1994, after the three Fall/Winter issues are disseminated, to assess response and effectiveness. This will be done largely by a set of student volunteers. We will randomly select 5%-10%, depending on the number of volunteers and time available, of Utah's elementary schools and directly call the principal to be sure that he or she has received the Elem-Net packets and to assess their recognition of the project, their responsiveness, and their general attitude.

We are also plan in the first 1994 issue to make $25 in science supplies and materials available to each of 20 classrooms who submit a letter summarizing the activities in the various ***EXPLORE!*** newsletters and providing their plans for the use of the $25 credit. Admittedly, this will reward and provide input from perhaps the more active teachers and classrooms.

At the Utah Association of Elementary School Principals (UAESP) meeting in January of 1994 we will directly poll and very briefly interview each of those principals with whom we can meet. Admittedly, these are preliminary and not very scientific or objective measures of assessment and efficacy, nevertheless they will provide considerable input and direction to the project.

One might think that a simple, short questionnaire to each of the elementary school teachers would be the most effective way to accomplish this, but our experience

suggests that they receive so many requests for that kind of input that most questionnaires and survey material of that type, either by mail or by phone, are ignored. We will also be monitoring the number of telephone and mail inquiries regarding ***EXPLORE!*** and the Elem-Net project to provide some indication of the level of impact and of interest.

We have also asked the University of Utah's Public Relations Department to utilize its PR clipping service to provide us with copies of any and all references to ***EXPLORE!***, the Elem-Net project, and the Center for Integrated Science Education in regional newspapers and other publications.

VII. Continuation and Long-Range Support -- Why a Second Year of Dreyfus Support?:

The ***EXPLORE!*** Newsletter part of the overall ELEM-NET project will require about $15,000 per year for the seven issues in the expanded inter-mountain area, plus staff support to write and produce those issues at about $15,000 per year. The staff is, of course, shared with other projects and initiatives. We have already been successful in securing limited local support for the existing activity, which has allowed us to supplement the limited Dreyfus funds that were provided for the first year of the project to enable the project to proceed.

The second year of Dreyfus support will give us the time and credibility to secure additional, longer-term local funding commitments. These will supplement the second year of activity and provide a financial foundation for subsequent years. Even local foundations, however, do not like to provide continuing, ongoing support. Rather, like Dreyfus, they like to initiate projects which then go on to develop their own, more permanent sources. Our strategy here is two fold. One, we are planning for specific issues of the ***EXPLORE!*** newsletter to be sponsored by specific entities, mainly local industries with a vested interest in enhancing the science skills of the general population. We are confident that each of the 7 issues per year will be sponsored by one or more local companies or foundations. We have already received funds from US West and the Michael Foundation, and have discussed ***EXPLORE!*** newsletter support in a preliminary way with officials at Geneva Steel, Hercules, Thiokal, Evans & Sutherland Computer Corp., and UNISYS. Other local firms with whom we expect to develop relationships and sponsoring partnerships include Novel, WordPerfect, Agridyne, HiClone Laboratories, Data Chem, Litton Ind., Rockwell International, and Huntsman Chemical. There are an additional 25 or so local firms who are large enough to consider the $2,500 to $3,500 contribution required for an issue of ***EXPLORE!***

Again, however, even local firms in their philanthropic activities do not like to take on permanent, long-term commitments, so we anticipate that this funding vehicle will only be effective over the next 2-3 years and take us perhaps to 1996-97.

We are very fortunate that in 1996 Utah expects to open the Utah Science Center, a major hands-on, discovery-based science and technology educational facility that is being called locally "the first of the 21st century's science centers." This science center is perhaps unique in that it involves a very close association between the public and higher education sectors and that part of the community involved with the development and planning of the science center. The science center plans an extensive outreach program involving, not only Utah, but the entire inter-mountain region and the western United States. J. Andrade, Director of the Center for Integrated Science Education, is also Program Chair for the Utah Science Center. The outreach activities are a component of the overall program committee and program activities at the science center.

We fully expect that the ***EXPLORE!*** newsletter, and a number of other activities of the Center for Integrated Science Education, will be transferred to, and become an integral part of, the outreach activities of the Utah Science Center. As planning and development for the Science Center expand, we fully expect the resources to be generated to permit ***EXPLORE!*** and the overall ELEM-NET project to be, not only continued indefinitely, but enhanced and expanded through its participation in the Utah Science Center project.

A major development effort is now being organized to provide the capital facilities and an operating endowment for the Utah Science Center. It will partially open in 1996 and then open in stages, culminating with a very major, overall opening in the year 2000. The outreach activities, however, are already being initiated, effective early 1994. It is anticipated that ***EXPLORE!*** and the ELEM-NET project will already be part of the outreach activities in mid-1995 or, at the very latest, in early 1996.

The Utah Science Center thus provides a firm institutional and financial commitment to this project, launched and developed by Dreyfus Foundation support.

VIII. Budget and Justification:
(Budget Table on next page)

One half summer month is budgeted for J.D. Andrade, Director of the Center for Integrated Science Education and director of the ELEM-NET project. Andrade will be personally responsible for all aspects of the project, and will also serve as editor of the ELEM-NET newsletter. Dr Julie Gess-Newsome, Assistant Professor of Educational Studies at the University of Utah, an experienced science teacher, is the major science content and science methods instructor for the Elementary Education Program at the University. One half month of her summer time is budgeted.

We have also budgeted ten $100 "honorary" payments for each of the participating faculty profiled in ***EXPLORE!*** . The actual allocation of these funds will depend on specific efforts. These individuals include members of the University of Utah faculty who are interested and involved in chemical science and technology issues. In the first year these are principally Dr. Ronald Ragsdale, Professor of Chemistry and Dr. Noel DeNevers, Professor of Chemical Engineering.

A part-time Project Coordinator position, filled by Mary McDonald, is essential to the effective conduct of the project. Ms. McDonald has primary responsibility for the day-to-day conduct of the projects.

Part time students are also budgeted. We have been very fortunate to have excellent student volunteers for much of the work. These individuals work closely with J. Andrade in selecting the various issues and topics, in talking directly with elementary teachers, principals, and supervisors in the state, and in working with science writers in the region. The students are involved in all activities necessary for the conduct of this project. These students are becoming majors in chemistry or allied fields and have a strong interest in science and technical education.

Part-time secretarial funds are for the large amount of secretarial work, including the development of a large mailing list; the production, layout, and general publication of the newsletters; mailing and distribution of those newsletters; and a variety of other activities. Salary figures are approximate and include benefits.

Limited travel is budgeted for the senior personnel to travel throughout the state to become thoroughly familiar with the schools involved and the local problems and issues which will serve as the stimulus for many of the ELEM-NET's activities.

Other direct costs are primarily for telephone costs, office supplies, and costs of printing and mailing the ELEM-NET newsletter. Newsletter printing and postage costs are about $1,500 per issue for Utah. This will increase to $2,500 to $3,500 per issue in the second year, as we expand our distribution to include those regions bordering Utah. The expansion will occur gradually and will be conditional on the availability of funds.

Budget:

Category	Year 1 (current support Mar. '93 - Feb. '94)	Year 2 (this proposal Mar. '94 - Feb. '95)	Year 3 and subsequent years (not requested from Dreyfus Foundation)
Personnel			
J.D. Andrade	$2,000 (1/2 month)	$2,000 (1/2 month)	$2,000
J. Gess-Newsome (1/2 month	$1,000	$1,000	$1,000
Other Faculty	$3,000	$1,000	$1,000
Mary McDonald, Project Coordinator	$6,000	$3,000	$7,000
Secretary/Newsletter Editor	$4,000	$4,000	$5,000
Students	$2,000	$1,000	$3,000
Supplies	$1,000	$500	$500
Travel	$1,000	$500	$500
Telephone	$500	$500	$500
Printing/Mailing	$4,500	$7,500	$12,500
Total Direct Costs:	**$25,000**	**$21,000**	**$33,000**

IX. The University of Utah

The University of Utah is the major State University in Utah, enrolling 26, 000 students. It is the largest teaching and research institution in the Inter-mountain West (between the Rocky Mountains and the Sierra Nevada Mountains in California). The University has excellent Departments of Chemistry, Chemical Engineering, Materials Science and Engineering (with a program in Polymer Chemistry), Biochemistry, and Bioengineering (with a program in organic biomaterials). It also has strong Departments of Pharmaceutics, Medicinal Chemistry, and Fuels Engineering. It has a strong program

National Center for Improving Science Education, Getting Started in Science: A Blueprint for Elementary Science Education, Washington, DC, 1989.

2. For example, the Utah Division of Curriculum and Instruction, Elementary Science Curriculum Guide, Salt Lake City Schools, March 1990.

3. R.S. Meyers, "Using News Media to Teach Chemical Principles", J. Chem. Educ., 68 (1991) 769-70.

4. The last page of each issue of Chemical and Engineering News often has good examples of the media's chemical anxieties and illiteracy.

5. Elementary Curricula with a strong chemistry component:

   -- Chemicals, Health, Environment, and Me (Chem), issue-oriented science for the elementary classroom (Lawrence Hall of Science, Berkeley, CA).

   -- Science for Life and Living, a concept-based, hands-on integrated curriculum by BSCS (Biological Sciences Curriculum Studies), (Kendall/Hunt Publ. Co., Dubuque, IA).

   -- Science and Technology for Children, the elementary science curriculum project based on hands-on activities. (National Science Resources Center, Washington, DC).

   -- Full Option Science System (FOSS), hands-on elementary science modules. (Lawrence Hall of Science and Encyclopedia Britannica Educational Corp).

   -- Chemical Education for Public Understanding Program (CEPUP), Lawrence Hall of Science, University of California, Berkeley, and Addison-Wesley Publ.

   -- Ice Picks, Discovery Kits, and Topics in Chemistry, by the Inst. for Chemical Education, University of Wisconson, Madison (608-262-3033).

   -- American Chemical Society (ACS), 800-227-5558
      Wonder Science: Physical science activities for children and adults (also available in Spanish.
      Chem Com: Chemistry in the community, a text and activity.
      Close up on Chemistry: A set of chemical demonstrations.
      Chemunity News, a publication of the ACS Education Division, Silvia Ware, Editor (202-452-2113).
      Directory of Outreach Program of the Chemistry Community, ACS Education Division, Dec. 1991 (202-872-8734).

   -- The World of Chemistry, hosted by chemist Roald Hoffmann, a 26 part video series (Annenberg/CPB collection, 800-LEARNER).

   -- Polyed, The Joint Education Committee of the ACS Divisions of Polymer Chemistry and Polymeric Materials, including Polymers and Plastics (L. Woodward, University of South Louisiana).

-- The Shaping of Things to Come, Society Plastics Industry (SPE), a materials/polymer technology and science curriculum.

-- Polymer Chemistry: A Teaching Package for Pre-College, National Science Teachers Association (NSTA) 1986.

-- Council for Solid-Waste Solutions, part of SPE (800-2-HELP-90).

6. Utah State Office of Education, 1992 Utah School Directory.

7. Project Director, J. Andrade, is a member of the State Office of Education Science Coordination Committee, the Board for a Utah Science Center, and the Utah Alliance for Science-Math-Technology Education.

8. A telephone line is installed, 8-5, M-F, and has 24 hour voice mail service, to encourage teachers and students to call with questions and problems, as well as to provide critique, suggestions, and other input.

XII. For Reviewers Only

To expedite the proposal review and evaluation process, we list below several questions which reviewers may ask:

1. *Why not get the Districts to subscribe to Wonder Science and related materials?* It's not only a question of the availability of materials, it's a question of concern, commitment, and professionalism. Direct involvement of chemists and scientists from the University tells the teachers that they are important--that they are professionals--that science and chemistry education is critical. Doing this on a regular basis provides commitment, reinforcement, and follow-through. There must be personal interaction, dialog, commitment--that is what CISE and ELEM-NET can provide.

2. *Why not just use E-mail?* Although E-Mail is relatively common at the college and University level, it is practically non-existent in the elementary schools. Those few teachers who are aware of E-Mail, and the even fewer ones who use it, are not the ones we really need to reach. We need to reach those who don't use computers and who don't sign up for science education workshops.

3. *This is all useless without the support of principals and administrators!* Right--we want them involved and supportive. We have already met -- and will continue to meet-- with them individually and through their local professional organizations. The principal receives the packet of ***EXPLORE!*** newsletters and distributes it to teachers. We use the teachers to motivate the principals--and use the principals (and teachers) to motivate the other teachers. We encourage the principals and teachers to develop school-wide activities--chemistry fairs, contests, field trips, etc.

4. *It won't work because teachers don't have the time to put science--and especially chemistry--activities together.* Right, again! There are already too many curricula and activity books which tell the teachers to get 25 of this and 25 of that and ....--for hands-on class activities. Most won't have the time or the inclination to do that, and the conventional commercial science activity materials tend to be expensive--especially for Utah, which has one of the lowest per student expenditures in the nation. We plan for selected ***EXPLORE!*** activities to include pre-assembled, inexpensive kits for the teachers

4. *It won't work because teachers don't have the time to put science--and especially chemistry--activities together.* Right, again! There are already too many curricula and activity books which tell the teachers to get 25 of this and 25 of that and ....--for hands-on class activities. Most won't have the time or the inclination to do that, and the conventional commercial science activity materials tend to be expensive--especially for Utah, which has one of the lowest per student expenditures in the nation. We plan for selected ***EXPLORE!*** activities to include pre-assembled, inexpensive kits for the teachers to use, paid for by local firms. We will design activities so that the kids can prepare the needed materials, using common, SAFE, kitchen and bathroom materials.

5. *University chemists can't talk to elementary teachers!* Right--in part--many of them can't--or shouldn't! We are educating and training our University advisors and consultants, so they are aware of the fears, anxieties, and insecurities of most elementary teachers. We plan to have luncheons and discussion sessions with our faculty colleagues so they know something about the nature of appropriate elementary science activities for students, and teachers. We will select and encourage only those participants who can effectively interact with elementary teachers and their students. Many of our otherwise excellent colleagues will not be involved because it is likely they would further intimidate and scare the teachers!

These are just a few of the many possible questions. Call J. Andrade, (801) 581-4379 or (801) 277-1259 (home) if you have other questions.

Appendix:

EXPLORE!, April, 1993.
EXPLORE!, September, 1993.
Center for Integrated Science Education brochure

THE UNIVERSITY OF UTAH

Center for Integrated Science Education (CISE)

January 31,1995

Gerard L. Brandenstein
Assistant to the Executive Director
The Camille and Henry Dreyfus Foundation, Inc.
555 Madison Avenue, Suite 1305
New York, New York 10022-3301

Dear Mr. Brandenstein:

Thank you for your recent phone call and the reminder to submit the Annual Progress Report for our Camille and Henry Dreyfus Foundation, Inc. Special Grant SG-94-005, awarded January 26, 1994 in the amount of $20,000. The progress report is enclosed together with a complete set of the *Explore!* newsletters produced and distributed to date.

Could you kindly arrange to send me a copy of the Camille and Henry Dreyfus Foundation's current grant and funding guidelines? This project has spawned a number of additional innovative project concepts which may be of interest to the foundation.

Please let me know if you need any further information.

Please give my regards to Dr. Robert Lichter. I hope you both have a healthy and productive 1995.

Sincerely,

J.D. Andrade, Ph.D.
Co-Director, CISE

cc: F. Gilmore, Development Office
M. McDonald, Project Coordinator

cise/23jan95

Department of Bioengineering
2480 Merrill Engineering Building
Salt Lake City, Utah 84112
(801) 581-8528
FAX: (801) 585-5361

The Center for Integrated Science Education (CISE) at the University of Utah was founded several years ago specifically to focus on the practicing elementary teacher. We have developed a set of activities and programs targeted to those individuals to improve their comfort level, skills, content knowledge and general attitude toward and confidence in science and mathematics. Although there are many national, regional, and local programs for high school and even middle school teachers,(workshops, summer institutes, and related activities,) the elementary school teacher is largely ignored. Our interest and commitment is on this population.

Initiation:

The project was formerly launched on February 12, 1993. Mary McDonald assumed the responsibility for the day to day direction of the Elem-Net project under the supervision of J.D. Andrade, Director of the Center for Integrated Science Education. They recruited several undergraduate student volunteers, key faculty in chemistry and chemical engineering, and selected staff with strong interest and effective track records in public science education. By working closely with the Science Coordinator's Office in the Utah State Office of Education and with the Utah Association of Elementary School Principals, as well as with the Utah Education Association (a major professional organization for elementary school teachers in the State), the elementary teacher and principal population were informed of the Elem-Net project.

Through the State Science Coordinator's Office a simplified but highly effective distribution mechanism was developed, which significantly decreased the distribution costs, permitting the project to be carried out of the funding level provided by the Dreyfus Foundation.

EXPLORE!:

The major single activity of the Elem-Net project is the development and distribution of our ***EXPLORE!*** Newsletter, a short, succinct, informative, highly useful publication which the teacher quickly and easily digests, and which provides the inspiration, the kick, the catalyst, the motivation to do chemistry and other science activities in the classroom. ***EXPLORE!*** is intentionally kept simple, short and non-glitzy. It is not printed in color and it is not on glossy paper, which not only keeps the cost down, but more importantly, treats the teachers as serious professionals. Much elementary teacher material is written as if it is for elementary students rather than for degreed professionals and adults. Nevertheless, it is written to be extremely easy to read, motivating, attractive, and highly practical.

Our inaugural issue was April, 1993. Seven issues have been published so far, with two additional issues scheduled for February and April, 1995. Each issue consists of a hands-on activity which can be performed in the classroom by the students as well as by the teacher using very common everyday materials generally found in typical kitchens or bathrooms. There are also important news articles of a professional nature. In our inaugural issue, for example, there was a brief write-up on the evolving national science standards. Sources of information, resources, and related information are also included. Each issue profiles teachers and lists awards and other professional honors and recognition. Contests or awards are also included.

We also met with the President of the Utah Association of Elementary School Principals (UAESP)and with his Executive Director, received their approval and endorsement of the project, which they then made known to their members. The principals thus knew about ***EXPLORE!*** before receiving the ***EXPLORE!*** mailings in their offices. We have been on the program for UAESP meetings and continue to involve Utah's elementary school principals.

We have worked with the Utah Science Teachers' Association so that the elementary and high school science teacher population does not feel in any way threatened or out of the loop. We have made presentations at the annual Utah Rural Schools Conference, the Utah Education Association, and the Utah Science Teachers Association, as well as regional meetings of the National Science Teachers Association.

We also distribute ***EXPLORE!*** to all individuals in the Utah System of Higher Education who have an interest in science education and teacher training. These include the various schools of education and science in the various colleges and universities in the system.

The Center for Integrated Science Education also conducts teacher inservices throughout the state of Utah. These inservice courses on Integrated Science Concepts and Themes have involved over 300 teachers in the past 3 years. The inservices are a good way to monitor the impact of the ***Explore!*** newsletter. At the beginning, of course, practically all of the teachers were unaware of the newsletter, but now the great majority of teachers involved (an excess of 90%) have seen and used our ***Explore!*** newsletter and are very complimentary regarding its content and its impact on their science and chemistry teaching activities in the classroom.

Other Support:

We have recently obtained small grants from US West, the Michael Foundation, Associated Regional University Pathologists (ARUP), Becton-Dickinson, Corp., and Chevron. By working with the University's Development office, local foundations and industries are expected to contribute to the project's ongoing support.

Summary:

It is clear that this project has had a significant impact on science teaching at the elementary level in Utah. It has also helped to catalyze a complete revision of the State Elementary Science Core Curriculum, which is now in place. Our activities have also been incorporated in a state-wide video television inservice program to prepare teachers for the new state core curriculum which is much more interactive and hands on than the earlier curriculum.

This project has also helped developed public interest and support for the Gateway Center, Utah's 21st Century Science/Arts Center. We have initiated preliminary discussions with the Gateway Center regarding their adoption of the ***Explore!*** newsletter as part of their ongoing outreach effort. This was the mechanism discussed in the second year proposal as a means to provide for continuation of the program after the cessation of Dreyfus Foundation support.

THE UNIVERSITY OF UTAH

6/24/99

Gerard Brandenstein,
Camille and Henry Dreyfus Foundation,
555 Madison Avenue, Suite 1305
New York, New York 10022

Dear Mr. Brandenstein,

We talked many months ago by phone regarding your need for a final financial and technical report on our Dreyfus Foundation grant titled ElemNET: Enhancing the Chemistry Experience in Utah Elementary Schools. The project ranged from March 1993 through February 1995. The financial report for the first grant year was submitted in late 1993 and acknowledged in a letter from you dated November 1, 1993 Re: Award Number SG-93-060. The second year of the award (SG-94-005) was funded effective Feb. 24, 1994 at the level of $20,000. The funds were expended from February, 1994 through February, 1995 for the ElemNET project, principally for the preparation and distribution of Explore!, the ElemNET newsletter for elementary teachers throughout the state of Utah (10,000 teachers!). The funds were expended as per the budget in the proposal (enclosed), with the exception that faculty support funds were reduced and secretary/newsletter production funds were slightly increased to meet the reduced budget of $20,000 and the increased production and printing costs associated with the Explore! newsletter. Enclosed please find copies of the Explore! newsletters produced during that period.

I am pleased to report that the project continues. It has stimulated a great deal of science education, chemistry in particular, activities through the office of the state science curriculum coordinator. It also helped to stimulate and develop a revised elementary science curriculum for the state of Utah. Explore! continues to be published and distributed to all elementary teachers in the state.

Without the Dreyfus Foundation support, it would have been very unlikely that this project would ever have been developed. The fact that the project has continued, and has been successful in obtaining local continuing support, documents its need and importance.

Please let me know if you need any further information.

Sincerely,

Joseph Andrade
Director, Center for Science Education and Outreach
Professor and co-Chair
Dept. of Bioengineering
University of Utah
joe.andrade@m.cc.utah.edu
50 S. Campus Center Dr., Rm. 2480 MEB,
Salt Lake City, UT 84112-9202

cc: Mary MacDonald, project manager,
University of Utah Development Office
enclosures: Explore! newsletters

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