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AUTHOR Fine, Carole S.; Friedman, Lawrence B.
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ABSTRACT

This report is the result of an independent evaluation of a project conducted during the 1990-91 school year with 56 teachers and over 1,800 students from 28 elementary schools in Iowa. The goals of the project were to demonstrate the effectiveness of new technology to improve science and geography instruction at the elementary level; train teachers in the use of technology; and encourage the dissemination and use of the National Geographic Society's Kids Network (KN) program, a telecommunications-based science program designed for students in grades 4-6. Kids Network, which is designed to foster critical thinking, recommends cooperative grouping for research and problem solving; promotes an interdisciplinary approach to science; allows students to conduct original research in the context of their community; and links students with teammates throughout the United States, Canada, and the world. The overview and introduction to the study include descriptions of the project, the network, the participants, and the significance of the project. The report also describes the study design and methodology; reports the findings; and provides a summary of the project and recommendations. It is concluded that this project was a success for the Iowa teachers and students and that the KN is satisfactory as is. Appendices, which constitute about half of the report, contain copies of the Project Application Form, the Teacher and Student Survey forms, and the Student Test; Results of the Teacher and Student Surveys; and copies of the Site Visit Protocols and the Hotline Form. (ALF)

Evaluation Report

National Geographic Society's Kids Network

in Iowa

1990-1991

submitted to:
The Roy J. Carver Charitable Trust
June 1, 1991

by the North Central Regional Educational Laboratory

Principal Evaluators:

Carole S. Fine
Program Associate

Lawrence B. Friedman
Program Director

Executive Director:

Jeri Nowakowski

EVALUATION REPORT

of

NATIONAL GEOGRAPHIC SOCIETY'S KIDS NETWORK

in

Iowa

1990-1991

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We would like to acknowledge the contribution of the teachers, students, and principals in the 28 Iowa project schools for their participation and cooperation throughout the study.

Anita Elementary
Central Elementary
Central Dallas Elementary
Colo Elementary
Clarence-Lowden Elementary
Danville Elementary
Dexter Elementary
Durant Elementary
Farley Elementary/Junior High
Forest City Elementary
Garfield Elementary
Gilmore City-Bradgate Elementary
Harris-Lake Park Elementary
Hinton Elementary
Madison Elementary
McKinley Elementary
Moulton-Udell Elementary
Mulberry Elementary
Radcliffe Elementary
Rex Mathes Elementary
Riverside Elementary
Tripoli Elementary
Virgil Grissom Elementary
Washington Township Elementary
West Lyon Elementary
West Union Elementary
Weldon Elementary
Wright Elementary

We are particularly grateful for the warmth, hospitality, and candor of the principals, faculty, and students in the six schools we visited.

Clarence-Lowden Elementary
Forest City Elementary
Garfield Elementary
Gilmore City-Bradgate Elementary
Rex Mathes Elementary
Tripoli Elementary

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I Project Application Form

II Teacher and Student Surveys and Student Test

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IV Site Visit Protocols and Hotline Form

I OVERVIEW OF THE STUDY

During the 1990-91 school year 56 teachers from 28 Iowa schools and their more than 1,800 students participated in a project sponsored by the Roy J. Carver Charitable Trust. The teachers received inservice training on the use of the National Geographic Society's Kids Network and then participated in two of the Network units with their students. Kids Network (KN) is a telecommunications-based science program designed for students in grades 4 through 6.

The goals of the Carver project were to: 1) demonstrate the effectiveness of new technology to improve science and geography instruction at the elementary level; 2) train teachers in the use of such technology; and 3) encourage the dissemination and use of the Kids Network program, as well as other innovative teaching methods related to science and geography, in Iowa schools. Another key element of the project was an independent evaluation of the project and its impact on the teachers, students, and schools that participated in it.

Kids Network, a technology-supported elementary science program, was selected as the instructional focus of the Carver project. This program combines several elements in an innovative approach to learning. The units are designed to foster critical thinking; students are encouraged to think for themselves, rather

than to identify and memorize a "right" answer. Cooperative learning is recommended as a means of facilitating student research and problem solving. Finally, the KN activities promote an interdisciplinary approach to science by incorporating geography, social studies, language arts, and mathematics into the program.

Students conduct original research, learning about scientific methods as they investigate authentic problems, such as acid rain, in the context of their own community. Computer telecommunications link individual classes with "teammates," other participating classes in the United States, Canada, and throughout the world. The teams collaborate on their research by sharing their findings. While conducting their research, students develop geography skills, in part, by using printed and computer maps to locate team members. The students acquire computer skills by using the KN software to write letters, complete maps and graphs, and telecommunicate data to teammates.

The Carver Trust arranged for an evaluation component in their project and contracted the North Central Regional Educational Laboratory (NCREL) to conduct the study. NCREL is one of ten federally supported, non-profit regional educational laboratories. NCREL developed the design of the study based on

guidelines established by The Carver Trust and feedback provided by The Trust, the Iowa Department of Education, the National Geographic Society, and the Technical Education Research Centers (TERC). (Kids Network originally was developed by TERC in collaboration with National Geographic with funding from the National Science Foundation.)

The reader should be aware of the limitations of this evaluation study. Findings and recommendations are based predominantly on the self-reports of teachers and students who participated in two of the four existing KN units. The schools were given all necessary hardware, software, and telecommunications subscriptions at no cost, and teachers received a $100 stipend for attending the inservice training. The study was conducted at a distance with one-day site visits to six of the participating schools. Finally, this evaluation focused primarily on teachers and more generally on students.

The evaluation found that teachers, entering the program with varying degrees of general and program-specific experience, learned to understand and value the goals and objectives of the KN program and the role of technology in it. They were able to manage the multiple components of the program and had some success integrating the activities into other content areas.

Both teachers and students believed that the program had a positive impact on student learning, particularly with respect to learning about specific science concepts and procedures. Most teachers planned to use KN again next year and said that they would recommend it to their colleagues. Moreover, there was strong evidence that the Carver model of providing teachers with in-depth program training enhanced the effectiveness of the program.

The evaluation also identified areas in which the program could be strengthened. In order to improve student learning, the activities that focus on the process of scientific thinking could be enhanced. Some of the computer software is in need of revision in order to correct flaws that interfere with program activities. And most significantly, program and/or software modifications are needed in order to assure fuller participation by subscribing classes.

II INTRODUCTION TO THE STUDY

Project Description

Project information and application forms (see Appendix I) were sent to all Iowa elementary schools during May, 1990. More than 200 schools submitted applications. The Iowa Department of Education selected 50 teachers, two each from 25 schools. The schools were chosen to reflect the student population distribution in Iowa elementary schools, with at least one site in the region served by each of the Area Education Agencies (AEAs). Three Muscatine schools (the location of the Roy J. Carver Charitable Trust) that applied also were included in the project. Project teachers participated in two days of inservice training conducted by the National Geographic Society (NGS) in August, 1990.

Schools and teachers in the Carver project received equipment and participated in KN project activities. NGS currently has four different KN units: Hello, Acid Rain, What's in our Water, and Weather in Action. Two of the units, Hello and Acid Rain (AR) were selected for use in the Carver project. The schools retained ownership of all hardware and software after completion of the project.

Each school received:

- An Apple IIGS computer with a color monitor, a 3 1/2" disk drive, a 5 1/4" disk drive, an Apple Imagewriter II printer, a modem, surge protector, and equipment cart;
- Up to $500 per school for installation and use of an outside telephone line;
- The telecommunications subscription which provides 120 minutes of computer participation on the Kids Network, which allows classes to send and receive their letters and data; and
- The instructional materials and telecommunications subscriptions for the Hello and Acid Rain units. Instructional materials for each unit included:
  - two copies of the Kids Network program disk (software);
  - one tutorial disk that describes the Program disk functions;
  - a Teacher's Guide that includes lesson plans;
  - a Software Manual;
  - reproducible student activity sheets;
  - 30 student handbooks;
  - National Geographic wall maps;
  - scientific materials, as required, e.g. pH paper;
  - the telecommunications calendar (deadlines) for the unit;
  - the unit scientist's initial letter (a professional scientist examines all the data collected by students on the Kids Network and communicates with the classes at different points during the unit).

All project teachers agreed to participate in:

- The two units, Hello and Acid Rain at designated "network" times, i.e. a specific six week session of the unit;
- The program evaluation; and
- A two day-training workshop in August, 1990 (for which each received a $200 stipend).

The workshop, based on a teacher preparation manual being developed and field tested by NGS, was led by the Kids Network teacher training coordinator and two Iowa teachers who had participated in several previous KN units. An Iowa computer teacher was responsible for some of the sessions on the use of the hardware. The sessions provided teachers with detailed information on the goals and objectives of the program and hands-on experience with the content, skills, strategies, and technology used in the units.

Videotapes furnished an overview of the program and illustrated what a KN lesson could look like in the classroom. Teachers worked in groups to get more detailed information about the Hello and Acid Rain units and to participate in a sampling of the activities and experiments.

Each school team had their own hardware and software to use throughout the workshop and to take back to their school at the

end of the two days. The teams first learned hardware basics, such as how to connect and use the computer, mouse, modem, and printer. They then were given considerable training and practice time using the actual KN software for word processing, mapping, and graphing. Telecommunications sessions were also demonstrated.

The teacher leaders shared their techniques for coordinating the program and integrating the activities across content areas. Both the teachers and the KN trainer shared information on potential problems, troubleshooting, and sources of assistance.

Kids Network Description

Students participating in KN learn about the unit topic by doing experiments and authentic research. The class' data are shared via computer telecommunications with 10-15 other classes. Students then analyze the data from all classes, looking for similarities and differences and reasons for them. Finally the students in the classes are encouraged to share their findings and conclusions with real audiences beyond their classroom.

In the Hello unit, for instance, students are introduced to the scientific process through topics that are familiar to them--pets and their community. They begin the unit by doing simple experiments and learning to make predictions, collect data, and

evaluate results. They also learn how to find their school's "global address" and those of their teammates on a map using latitude and longitude.

This training in the scientific process is soon applied as they collect information on their pets. They use the computer to display the data on several types of graphs and telecommunicate the raw data to their teammates. They also research, write, and send a "community letter" which describes their school, community, climate, landscape, economy, transportation, and local entertainment spots. The students make predictions about the information that they will receive from their teammates based on their own data and the other classes' global addresses and community letters. When they receive the pet data from the other classes, the students compare them with their predictions and with their own findings. They look for patterns and surprises in the data and discuss reasons for both. Finally, classes focus on ways to present their information to an audience outside of their classroom, e.g. writing an article for a school or community newspaper describing the research and discussing the topic.

In the Acid Rain unit students begin learning about acids by using pH paper to measure the acidity of a variety of liquids. They then design and build their own rain collectors to gather

data on the acidity of local rainwater. Multiple rain samples are collected (assuming it rains repeatedly during the period) and tested. This information is charted and then telecommunicated to teammates. As in the Hello unit, community letters are written and sent to the other classes. In this unit the letters include a description of the community, but also focus on local sources of acid-producing gases. Using their own findings and the other classes' community letters, predictions are made and the incoming data are then analyzed and compared with both their predictions and the local findings.

As part of this unit, students also investigate sources of acid-producing gases in their community to learn about the relationship between human activities and the acid rain problem. The students are exposed to opposing viewpoints (written from the personal perspective of fictitious students) on ways of dealing with the acid rain problem and they are asked to take a position. Again as a final step in the process, the class presents both their data and their recommendations to an audience beyond the classroom.

Project Participants

The State Project schools were selected to reflect the demographics of Iowa as a whole.

- Recent population estimates (County and City Data Book, 1988) list Iowa with a population of 2,851,000, a loss of almost 63,000 people since the 1980 Census.

- Iowa is a highly rural state with two-fifths of the state population living in rural areas (using the Census Department's conservative definition of a rural place being one with under 2,500 people.)

- The majority (three-fifths) of the state population is urban, but it is urban in a small sense. Eight population centers in the state have more than 50,000 people each, but only three of those have populations of over 100,000. Des Moines, the largest city, does not top 200,000.

- Iowa has a mostly white population, 97.51% in 1980. The black population constitutes only 1.45% of the total population and is located primarily in urban areas. The Native Americans in the state totaled only .22%, Asians .48%, and Hispanics, 1.70% (NCREL, 1990).

The Schools Project schools were selected by the Iowa Department of Education to reflect overall state demographic patterns and enrollment distributions. At least one school was selected in each of the 15 Area Education Agencies, the state's intermediate service system. The remaining sites were selected in those AEAs with the greatest student enrollments.

Forty-two percent (Iowa Department of Education, 1989-90) of Iowa school districts and 39% of the project school districts have a total enrollment of no more than 500 students. Half of the project schools are the sole elementary building in their districts. Approximately 74% of Iowa school districts and 73% of project districts have minority enrollments of 2% or less. A

picture of the schools and their districts is captured in the chart below:

The 28 Project School and their Districts[1]

School Enrollment		District Enrollment		Enrollment Shift[2]	
< 150	5	< 500	9	Up	2
150 - 250	8	501 - 1,000	7	Down	3
251 - 500	13	1,001 - 5,000	6		
501 - 800	2	5,001 - 18,000	4		
		18,001 - 31,000	2		

# Teachers in District		Relative Wealth Indicator[3]		College Bound[4]	
< 50	15	< 75%	1	< 30%	2
51 - 100	4	75 - 85%	8	30 - 50%	2
101 - 500	7	86 - 95%	16	51 - 80%	13
501 - 2,000	2	> 95%	3	> 80%	2
				NA	9

[1]The above chart aggregates information from QED's school guide 1990-1991: Iowa (Quality Education Data, 1990).

[2]Enrollment Shift -- Districts with student enrollments that have changed more than 20% since 1982 are noted.

[3]Relative Wealth Indicator -- Percentage of school age children within the boundaries of a district that live in families with incomes greater than that defined as poverty level by the US Education Department.

[4]College-Bound -- Percentage of high school students reported to enroll in two or four year colleges the previous year.

The Teachers The experience and education of participants varied substantially. Classroom experience, which ranged from a first year teacher to one with 32 years of experience, averaged close to 13 years. Educationally the group ranged from bachelor's degrees through master's plus 30 semester hours with 50% of the participants having 15-30 semester hours beyond a bachelor's. Eighty percent of the teachers are female. Just over half of the teachers have self-contained classes and close to 40% were in departmental or semi-departmental structures. Three of the project teachers are in talented and gifted (TAG) programs, and one is a library/media specialist. The TAG teachers and media specialist teamed with classroom teachers, sharing responsibility for the units according to their own design.

The Students More than 1,800 students participated in the project.[1] The group was almost evenly divided between girls (48.5%) and boys (51.5%) and more than 92% were between the ages of nine and eleven (24.3%, 41.0% and 27.0% respectively). Nearly all of the students (99%) were in grades 4 (32.6%), 5 (45.1%), and 6 (21.2%). Although no racial or ethnic data were collected,

[1]Data are from the Pre-Project Student Survey.

it can be assumed, based on Iowa demographics, that most of the students are Caucasian.

Mainstreamed special education and Chapter I students were not identified for the evaluators and the evaluators did not have information of prior achievement levels for any of the other students.

Design and Methodology

The evaluation focused on four key questions related to satisfaction with and effectiveness of the KN program. Primary attention was given to the project teachers, although the impact of the program on student learning and attitudes was also addressed. Evaluation data were gathered through a variety of complementary methods that included teacher and student surveys, student tests, site visits, and an examination of NGS Hotline (customer service) records.

Project Significance

A high priority for educators across the country is to move away from isolated computer labs and software that are simply add-ons to classroom curricula and instruction. The goal is to integrate technology into classroom instruction and use it as an instructional tool and not an end in itself. This project reflects this viewpoint with its goal of using technology to

improve science and geography instruction at the elementary level.

In order to assess fully the effectiveness of the project, an evaluation was made an integral part of it. This evaluation is significant in that it includes an examination of the teacher change process, following the teachers from the time of their inservice training through incorporation of the program into their classroom and completion of two instructional units. It also begins to look at the impact of the KN program on student learning and student attitudes toward science and technology.

Moreover, this is the first independent evaluation of the Kids Network and the first opportunity to study the program on such a large scale.

Finally, just as the Kids Network encourages students to work collaboratively, this project represents the collaborative effort of a philanthropic trust, a major corporation, a state department of education, and a regional educational laboratory. The study has been conducted, throughout, in a spirit of collaboration. All of the groups were asked to, and did provide valuable feedback as the evaluation instruments were being designed. The Iowa State Department was extremely helpful to

NCREL during the study, and the National Geographic Society provided all requested information.

The findings and recommendations of the study are subject to certain limitations. They are based predominantly on the self-reports of teachers and students who participated in two of the four existing KN units. All schools were given the necessary hardware, software, and telecommunications subscriptions at no cost and teachers received a $100 stipend for attending the inservice training. This evaluation was conducted at a distance with one-day site visits to six of the participating schools. Finally, this evaluation focused primarily on teachers and more generally on students.

III STUDY DESIGN AND METHODOLOGY

The evaluation focused on four key questions. While the study looked at both teachers and students, the primary emphasis of this study was on teachers. The evaluation questions were:

Content, Skills, & Strategies in the Hello & Acid Rain Units

1) Teachers: How did teachers' experience with, understanding of, and ability to teach the skills, strategies, and content taught in the Hello and Acid Rain units change as a result of participating in the project?

   Students: How did students' interest in and understanding of the skills, strategies, and content taught in the Hello and AR units change as a result of participating in the project?

   One of the major goals of the project is to improve science and geography instruction at the elementary level. Enhanced student learning is also a primary focus of both the Carver project and the Kids Network program. The ultimate goal of the project and program is to improve instruction and student learning, using technology as a support.

Technology Use in Kids Network Activities

2) Teachers: How did teacher understanding of and appreciation for, the technology used in the KN units and technology-based instructional programs change as a result of participating in the project?

   Students: How did students interest in, understanding of, and comfort with technology change as a result of participating in the project?

   Technology plays an important role in the KN program. If teachers do not become comfortable with the technology and find it instructionally valuable, they

and their students will be unlikely to benefit fully from Kids Network and the teachers will be less likely to use it or other technology supported programs in the future.

Often teachers and students view technology as an end in itself. Many have had limited and narrow experience with computers. If they are to begin using technology as an learning tool, their understanding and appreciation of technology must broaden.

Management

3) How effectively were teachers able to manage the components of the Kid's Net program?

Kids Net is a multifaceted program with several components that must be coordinated and integrated. If management of the program is too cumbersome for teachers, students are unlikely to gain full benefit from it.

Integration

4) To what extent was the program integrated with the rest of the class and school curriculum?

This question was important because of interest in determining whether the program could be integrated with the rest of the classroom curriculum or would simply be an "add on." Additionally, it was valuable to examine the extent to which the program supported and enhanced school and district instructional goals.

A fifth and cross-cutting question was added to study the impact of the unit scheduling on the four primary questions.

Unit Scheduling

5) Is the program more effective for classes that use only one unit per semester as opposed to those who participate in two units per semester?

National Geographic materials do not suggest that this is important, but key individuals at both NGS and TERC, creators of KN, expressed concerns that teacher and student satisfaction with the units was reduced when two units were used in a single semester.

In order to address this question half of the classes (randomly selected) were requested to participate in both units during the fall semester (Hello: September 4-October 26, AR: November 5-December 14), and half of the classes were asked to use the Hello unit during the fall semester (September 4-October 26) and Acid Rain in the spring (January 7-March 1). Fifty-four of the classes followed this schedule, while two teachers chose to participate in an Acid Rain unit that ran from February 11 to April 5. For the remainder of this report the two groups will be referred to as the fall/fall (F/F) and fall/spring (F/S) groups.

The data were collected using several strategies in order to obtain the broadest possible range of information; the individual components were designed to complement one another. The strategies were:

1) Teacher Surveys (Appendix II, results in Appendix III)

All teachers completed a 22-question, 58-item (self-report) survey on the first morning of the inservice prior to beginning the training. They were given a 10-question, 16-item survey at the close of the second day of training. Finally a 27-question, 96-item survey was mailed to all project teachers the week before the end of their second unit. The surveys were designed to

measure teachers' experience and comfort with, and appreciation of the content, skills, strategies, and technology of the two KN units. The surveys also looked at the effectiveness of the inservice training. (The survey methodology is described more fully in Appendix III.)

2) Student Surveys (Appendix II, results in Appendix III)

All students completed a 21-question, 30-item pre-project survey and a 23-question, 23-item post-project survey. The instruments were used to assess students' attitudes toward and expertise with the content, skills, strategies, and technology used in the KN units. (The survey methodology is described more fully in Appendix III.)

3) Student Post Project Assessment of Skills, Strategies, and Content (Appendix II)

This 7-question, 7-item test was used to measure students' ability to apply the content, skills, and strategies of the Acid Rain unit to a novel situation.

4) Site Visits

Site visits were conducted at six purposefully selected schools. The schools were chosen to reflect a cross section of the schools involved in the project and Iowa schools, in general, as described in section II. An evaluator initially interviewed the 12 teachers from these schools at the inservice meeting and then spent one day in each of the schools during the last two weeks of their Acid Rain unit. The visits included:

- Classroom observation of Kids Net and non KN lessons;
- Teacher interviews (Appendix IV);
- Principal interviews (Appendix IV);
- Student interviews (Appendix IV); and
- Review of student portfolios (when available).

5) Inservice Training

An evaluator attended the two days of Inservice Training in August. While there, she conducted pre-project interviews with the 12 site visit teachers and spoke informally with additional teachers during breaks and at group meals. During the training sessions the evaluator served as an non-participating observer.

6) National Geographic Hotline Logs (Appendix IV)

Records from both the Hello and Acid Rain units were analyzed for problem categories and frequency and reported resolutions.

7) Informal Data Sources

Teachers were required to send the evaluators data twice during the project. Many teachers included notes with these materials that expressed their opinion about the strengths and weaknesses of the KN program.

IV FINDINGS

Reporting Format

Project findings are reported in the following sections for each of the four major study questions in general and then by the two conditions, fall/fall and fall/spring. Based on the evaluators' experience with staff development and student instruction, the data for each of the four questions were further analyzed according to four divisions:

- Teachers' familiarity and experience with the content, skills, and strategies used in the KN units;
- Teachers' years of classroom experience;
- Classroom organization, i.e., self-contained or departmentalized classes; and
- Grade level.

The analysis of the teachers' surveys suggested that student responses were analyzed across conditions and grade level.

Project findings are first given for the general group, which includes all teachers and students. Where there are significant differences, they are broken down by the two study conditions and/or by the additional variables.

Question #1: Content, Skills, and Strategies in the Hello and Acid Rain Units

In this section, findings will be reported first for teachers and then for students.

Teachers: How did teachers' experience with, understanding of, and ability to teach the skills, strategies, and content taught in the Hello and Acid Rain units change as a result of participating in the project?

Goals and Objectives The Kids Network approach emphasizes hands-on learning, authentic and original research, and critical thinking. The units were designed to encourage and facilitate cooperative learning and an interdisciplinary approach.

Teachers entering the project varied in their familiarity and expertise with the content, skills, and strategies used in the KN units. On the pre-project survey, well over three-fourths of the project participants reported having had moderate or considerable experience with teaching critical thinking, cooperative learning, and hands-on science (although these terms were never defined for or by participants).

Interviewed at the time of the training, most participants indicated that they increasingly used text books more as a resource and supplement than as the foundation of their science program. Reasons cited for using the hands-on approach included a desire for increased student learning, personal teaching improvement, student responsiveness, and district mandates.

Teachers had less experience with the specific science content and process of the units than with the non-science strategies. More than half of the group said on the pre-project survey that they had minimal teaching experience with the topics of acid rain, acids and bases, and the processes of finding patterns in science data and scientific research methods. However, teachers did indicate that they had more experience with the less science-specific content, i.e. map and graphing skills and letter writing. Those in departmental structures (e.g., science teachers) generally ranked their expertise in these specific areas, and their overall ability to teach the information and skills, higher than teachers of self-contained classes.

There was some suggestion that the fall/fall teachers felt better prepared to teach the information and skills than the fall/spring group, but this difference was evident in just a few of the many items on the survey. Some differences among the experience of teachers in different grade levels existed, but there were no clear patterns. Occasional differences, without a distinctive pattern, were also found when the group was viewed by their years of teaching experience.

The most noticeable differences in the entering group were for those labeled high "KN approach" teachers. This grouping was based on responses to a 12-item question (pre-project survey #14) designed to identify those teachers with the most experience with the KN content and instructional approach, as described in the

teacher's guide. This group entered the project with more information about the KN program and more experience and comfort with the content, skills, strategies, and technology. Prior to the inservice training this group felt better prepared than other teachers to use the KN units.

Although teachers entered the project with a wide range of experience and comfort with the "KN approach," during the inservice they developed an enthusiasm for key program components that was maintained throughout the project. This is illustrated in the following chart:

Teacher Surveys
Post-Inservice/Post-Project Comparisons

Importance of Kids Network goals (not important 1 <-> 3 very important)	Post-Inservice	Post-Project
Students explore real and engaging scientific problems.	2.98	2.98
Students understand that science is a cooperative venture.	2.91	2.90
Students participate in inquiry-oriented, hands-on science.	2.98	2.94
Students develop science process skills.	2.91	2.82
Students use the computer to record, receive, and share information.	2.83	2.76
Student activities are interdisciplinary.	2.77	2.78

Teachers not only felt that they had a good understanding of the goals and objectives of the program, but they felt very strongly about the significance of these goals. In fact, they came to value the KN approach of original research, interdisciplinary study, and cooperative learning so much that when asked on the post-project survey, most teachers said that they would consider teaching other science units in the same way.

It is particularly interesting to note that although two groups, the high "KN approach" teachers and the departmental science teachers, entered the program with more experience with the content, skills, and strategies, these differences were no longer evident on exit instruments. Similarly, when the data were analyzed by the F/F and F/S groups, classroom experience, and grade level, there were isolated differences but no patterns between these two groups.

On indicators of perceived student learning, teacher ratings were generally quite positive. Teachers did report more confidence in student learning about scientific concepts and procedures (e.g., acid rain, global address, how acid rain affects the environment, and finding the pH of a liquid) than scientific thinking (e.g., the difference between an hypothesis and a guess, evaluating predictions, and why science data are important).

During interviews, teachers reported that they were still pleased that students were learning how to do scientific thinking. They said that their classes discussed how they

arrived at their predictions and if they were not accurate, they critically considered the possible reasons. This was repeatedly observed by an evaluator. One teacher, for example, was heard asking her class, "What could have caused us to be off on our prediction? You might want to look in your [community] letter again and see if there's anything in there."

The teachers were also seen helping students to appreciate the scientific thinking process as much or more than the actual data. In one classroom, students had made a prediction that did not prove to be accurate. Their teacher told them, "That's OK. You made a prediction and now you've checked it out."

Global Awareness Post-project survey data reveal the great significance teachers attached to students' opportunity to learn about other schools and communities. The research teams, telecommunicating, and mapping information about other communities were all rated as very important components of the program.

This global awareness was mentioned over and over during teacher and principal interviews. In fact, in descriptions of the most important parts of the program, the component most consistently mentioned was learning about other students and communities. Many of the project schools are in relatively remote rural communities, and teachers and principals said how pleased they were to be able to provide their students with the opportunity to learn about places very different from their own. Teachers frequently pointed out ways in which this spilled over

into other classroom activities. For example, in a rural school an evaluator visited during early December, the teacher opened the day by discussing current events with her students, including several that related to their unit. She had also created a holiday bulletin board, with a new twist on an old theme, where students were displaying their wishes for a "global Christmas." Moreover, many teachers reported that when they were teaching social studies units, their students showed a keen interest in areas where they had a teammate.

On-site conversations with teachers revealed that the community letters provide a living textbook for the students. Students were able to identify personally with specific groups of students -- real students with names, families, pets, and homes. In many cases, the exchanges went well beyond those dictated by the unit activities. A number of classes exchanged videotapes and/or packages filled with local artifacts, e.g. student and family photos, Iowa soil, postcards of local attractions, and samples from local businesses and agriculture. One class, for example, reported receiving a package of fresh fruit from their Florida teammates.

Not only did students learn about other communities, but in doing the research for their own community letters, they discovered many new things about their own towns. This was cited as a strength of the program by numerous teachers and principals.

Authentic Science Investigation Teachers were also favorably impressed with the significance of their students doing

authentic research. They gave high marks on the post-project survey questions that asked them to rate the importance of students exploring real and engaging scientific problems and understanding that science is a cooperative venture.

The Acid Rain unit encourages students to think and problem solve about important environmental and social issues. For example, in one classroom observed, the teacher pointed out that a nearby community had a high pollution level (as indicated by a map provided in the unit materials). She asked the students to think about the reasons for this situation. When the students determined that it was due to a power plant that provided energy to their own community, she encouraged them to think about the social issues involved with another town enduring high pollution so that they might "watch TV." In another class, two sixth grade girls, without teacher prompting or presence, entered into a lively debate about who should assume the responsibility for polluting cities and countries.

As part of their work on these problems, students had an authentic need to use reference materials. While visiting classes, an evaluator frequently saw students using encyclopedias, globes, and atlases in order to learn more about the communities of their teammates. Concepts such as time zones, latitude and longitude took on real meaning for these students as they attempted to locate their new friends.

Instructional Roles Although survey data are not available regarding instructional roles, evaluators observed that in most

cases both teachers and students assumed non-traditional roles while participating in KN. No longer was the teacher the authority and source of all information. Although teachers reported spending a lot of time organizing and preparing for lessons, they said that they did more participating than leading during the actual lessons. One teacher commented that in the past she had been uncomfortable teaching science because she did not have a strong content background. Now, however, she was not responsible for having all of the right answers. Her job was to facilitate learning, but she could learn about the topics along with her students. Another teacher said, "They think I'm the best teacher in the world!" When that same teacher was asked if the experience of using KN would have an impact in the future on her teaching of science, she responded, "Yes, I'll never use a textbook again."

Student Assessment There are mixed, but limited, opinions regarding the assessment opportunities provided in the KN units. No survey data are available on this question. Interview data suggest that the primary way teachers assessed students on the units was through observation, class discussion, review of the worksheets, and participation and cooperation in the groups. Most of the teachers interviewed expressed with some reservations the opinion that, for these units (given their length and format), these are probably adequate measures. As one teacher pointed out, although it would be useful to have more evaluation data, she would rather not sacrifice time from the unit

activities in order to increase the time for assessment. More in-depth study of the assessment component of KN would be valuable.

Suggestions for Improvement Teachers being interviewed had few suggestions for improving the KN program with respect to the content, skills, and strategies. One of the few recommendations related to expanding the geographic range of teammates. While teachers were very enthusiastic about having the opportunity to correspond with and learn about people in other communities, many interviewed mentioned that they would like to have more teammates outside of the U.S. During interviews, many teachers reported that they expected to have a least a couple of foreign teammates in each unit and were disappointed when this did not occur. One teacher related that her students were delighted to learn that their teammates included classes in Japan and Okinawa. However, shortly after the assignments were made, these classes were withdrawn.

Summary The data from teacher and principal surveys, interviews, and evaluator observation suggest the following with respect to teachers' attitudes toward, understanding of, and ability to teach the content, skills, and strategies in the KN units:

1. Teachers understand and value the program goals and objectives.

2. Teachers believe that their students have learned from participation in the program, particularly with respect to the specific scientific concepts and procedures.

3. Teachers believe that their students have benefitted from participation in the program because of the community and global awareness developed.

4. Teachers value the opportunity to involve students in authentic science investigation.

5. There is some evidence that teachers and students assume non-traditional instructional roles when participating in the units.

6. There are limited and mixed opinions regarding the adequacy of assessment opportunities in the units.

7. Teachers would like to have more international teammates in order to provide their students with expanded opportunities for global awareness.

Students: How did students' interest in, and understanding of, the skills, strategies, and content taught in the Hello and Acid Rain units change as a result of participating in the project?

Student Learning Prior to the project, the students were not especially enthusiastic about studying science. When asked if they felt "excited," "OK," "unhappy," or "don't know" about studying science, the majority said OK. There was, however, greater enthusiasm for working in teams with other students. And as with teachers, an entering self-report of familiarity with the content, skills, and strategies used in the KN units revealed that students were least familiar with the content of the acid rain unit and with scientific methodology, e.g. making and checking predictions and hypotheses. They had more familiarity with graphing and mapping skills. There were some reported differences in content knowledge, but no clear patterns, across grade levels and the two conditions, Fall/Fall (F/F) and Fall/Spring (F/S).

Students were asked again on the post-project survey to assess their knowledge about the content, skills, and strategies contained in the two KN units. A significant and positive difference for all students was evident on questions between their pre- and post-project responses, as illustrated in the following chart:

Student Surveys
Pre/Post Test Comparisons

Question	Pre-project	Post-Project
How much do you know/did you learn about using maps?	2.76	2.89
How much do you know/did you learn about how scientists do research?	1.98	2.66
How much do you know/did you learn about finding a global address?	1.65	3.03
How much do you know/did you learn about doing science experiments?	2.70	3.14
How much do you know/did you learn about acids, bases, and the pH scale?	1.57	3.26
How much do you know/did you learn about acid rain?	1.93	3.34
How much do you know/did you learn about making and checking predictions and hypothesis?	1.54	2.61
How much do you know/did you learn about finding patterns in science information?	1.85	2.41
How much do you know/did you learn about how winds affect acid rain?	1.45	2.86
How much do you know/did you learn about how acid rain affects the environment?	1.99	3.39

There was some suggestion of difference in reported learning between the F/F and F/S groups, but there were no obvious patterns. And this difference is not consistent with teacher ratings.

It is interesting to note that fourth grade students consistently ranked their knowledge acquisition as higher than either the fifth or sixth graders. Fifth graders were somewhat higher than sixth graders, but not as definitively as the fourth graders. Given that no such differences appeared in teacher ratings, these findings should be taken with a grain of salt. However, they do suggest that it would be useful to look more closely at grade level differences.

All students were also given a post-project assessment designed to measure their ability to apply the content, skills, and strategies of the AR unit to a novel situation. However, an analysis of the results indicated that the instrument was not reliable. It is not known whether this is a problem with the test itself, inconsistent scoring of the items, or a combination of both. In any case, no conclusions can be drawn from this test. It will be important, therefore, to take a closer look at the impact of KN on student learning.

Global Awareness Interview comments revealed that students particularly enjoyed having the opportunity to learn about other communities. Over and over students commented on their excitement and surprise at learning how much they had in common

with students around the country. They pointed out that they were learning about other communities and the ways in which they were similar and different from their own. When asked how they would improve the program, students primarily suggested ways to increase this contact, e.g. increase the number of teammates, add more teams outside of the U.S., send videotapes (of their school and community) to all of the schools, get to talk to specific students in the other schools who share interests, let everyone in their school participate, and meet their teammates face-to-face.

Challenges Student survey data were consistent with teachers with respect to the most challenging parts of the program. The self-rankings were lower on scientific processes such as how scientists do research, making and checking predictions and hypotheses, and finding patterns in science data.

Interview data were not always consistent with the surveys. Interviewed students were split with respect to what was the most challenging part of the program. Many students, in fact, felt that none of the activities were too difficult, while some found the locating of global addresses on the maps to be most troublesome. Although all students appeared to enjoy <u>receiving</u> community letters from other classes, a portion of those interviewed reported that researching and writing their <u>own</u> letter was the most difficult part of the unit. A small number of students found collection of the rain samples troublesome because they or their partner had to remember to take the

collector home each night and go out in the rain to get the samples. It seems likely that the interview data reflect the appeal of certain activities as well as the difficulty of them.

Authentic Science Investigation The Acid Rain unit led to heightened student awareness of, and concern for, environmental issues. On the post-project survey, students indicated that they had learned a lot about how acid rain affects the environment.

This finding was supported by the interviews. Typical student comments in response to the question "What have you learned by doing the KN units?" were, "Acid rain isn't just a problem for big cities; it's a problem for everybody," "[dealing with acid rain is] important or it will get worse," and "[I learned] what things like acid rain and pollution can do if we don't do something about it."

Enthusiasm for KN Students were generally enthusiastic about the KN program. When asked on the post-project survey if they would like to do more KN units, the overwhelming majority indicated that they would.

During interviews, students were asked to rate KN on a 1-10 scale, with 10 being the most positive. Over 90% of students ranked KN with 7 or above and 41% gave it a 9 or 10. The lowest ranking given, 3, was selected by only one student. When asked what they liked least, students frequently reported that they liked it all and wouldn't want to change it in any way.

Summary The data from student surveys, tests, interviews, and evaluator observation suggest the following findings about students' interest in, and understanding of, science as a result of participating in the KN units:

1. Students believe that they have learned from participation in the program, particularly with respect to the specific scientific concepts and procedures.

2. Students were quite enthusiastic about the opportunity to communicate with and learn about students in other communities.

3. Students became more sensitive to environmental issues as a result of their participation in the program.

4. Students appreciated the KN approach to science.

Question #2: Technology Use in Kids Network Activities

In this section, findings will be reported first for teachers and then for students.

Teachers: How did teacher understanding of, and appreciation for, the technology used in the KN units and technology-based instructional programs change as a result of participating in the project?

In the KN units, computers are used to write letters, graph data, map school locations, and telecommunicate the letters and research data to teammates. Survey data indicate that, as a whole, project teachers had limited school access to and experience with computers. (An attempt to define a technology index from items on the pre-project survey analogous to the "KN approach" idea did not distinguish between those with little experience using technology and those with much experience.)

More than half of the teachers did have at least one computer in their classroom during the year prior to the study, and just under half had their own computer at home. However, prior to the project, instructional use of computers had been primarily for drill and practice, games, problem solving (not defined), and word processing. None of the teachers had involved their students in telecommunicating (a key feature of the KN program). Teachers themselves had used computers primarily for word processing and, again, very few had telecommunicated.

Comfort and Value In general, teachers observed during the inservice voiced more apprehension about the technological

aspects of KN than any other component. About one-third of the teachers (evaluator observation) at the training took advantage of early morning, late afternoon, or evening computer and telecommunications practice sessions.

In contrast to their pre-project technology anxiety, teachers reported on the post-project survey that they had been moderately or highly successful in their use of the technological elements of KN. Not only did most teachers feel successful, but they also increased their valuing of the instructional use of technology, believing that telecommunicating and the computer software were very important to the success of the units.

Most of the teachers noted on the pre-project survey that upon entering the project they had no idea or only a basic understanding of the role technology played in the KN units. Yet they ended the project with a self-perception of moderate or thorough understanding. In rating the importance of KN program goals on the post-project survey, high rankings were given to the goal of students learning to use the computer to record, receive, and share information. This is an indication that teachers had broadened their early instructional view of computers.

In light of the teachers' satisfaction with the programmatic elements of KN, it is perhaps not surprising that they came to value the technology. For instance, they gave high rankings to the importance of doing authentic, cooperative science research with teams from other schools. In KN these goals are accomplished through the use of technology.

Several other variables affected this increased comfort with and valuing of computers. The teacher inservice, one of the most significant factors, and the support of building colleagues will be addressed in a later section. Another important component was the Kids Network telephone hotline.

KN Hotline The KN hotline provided teachers with technical and procedural support. The hotline was a toll-free number that operated between the hours of 7:30 A.M. and 6:00 P.M Eastern Standard Time, Monday through Friday, during the units. Survey data indicate that most teachers found the hotline to be quite helpful in addressing their technical problems. Most of the teachers made use of the hotline and rated it as being quite important to the success of the program.

Teachers being interviewed reported that if your computer was located near the phone, the hotline staff would "talk you through" your problems. In many classrooms visited, the hotline phone number was prominently displayed for ready access.

Suggestions for Hotline Improvement Teachers reported during interviews, however, that there was a variation in the quality of service during different units. Sarah Clark, manager of the hotline, accounted for this by explaining that at the time of the fall Hello unit there was no other unit running. But during the fall and spring Acid Rain units there were other units running as well. At some points the hotline was "swamped" and as a result additional personnel were hired in February, 1991. NGS also reports that they plan to supplement personal hotline

service with an automated attendance function. This will be a voice mail system where people go through a series of menus and submenus to access solutions to common problems. For example, one recording would say, "If you are having difficulty with modem response press X." After pressing the designated number, the listener would hear several possible modem solutions.

Telecommunications Deadlines The sharing of community letters and research data with other teammates is accomplished through computer telecommunications. Prior to the start of the unit, teachers receive a telecommunications calendar with deadlines by which to send specific information. The success of this teaming relies on timely telecommunicating.

On the post-project survey, teachers were asked to indicate whether they and their teammates had met all (1), most (2), some (3), few (4) or none (5) of the telecommunications deadlines. Their responses indicated that they had been able to meet most or all of the deadlines, but that the other members of their team had been much less effective. While the mean score for the teachers themselves was 1.37, it was only 2.47 for the other classes.

This poor response rate was of major concern to teachers, principals, and students. And in a program where participants were generally very pleased, this problem stood out as quite significant. During interviews, teachers reported that they received complete data, e.g. team identification (global address), community letters, and the acid rain and pet data from

only a half to three-fourths of the schools on their team. Several teachers also mentioned the problem in notes they sent when returning the evaluation materials. No information is available to detail specifically how many teammates were late and how many teams never sent their data at all.

Teachers reported in notes and interviews that their students find this lack of participation extremely disappointing. After their expectations about their teammates are built up from the initial team information they receive, they are very let down. Both the teachers and students feel quite discouraged by this. In one class, for example, an Australian class was assigned to their team. In anticipation of receiving their data, the Iowa class did research on the country. The teacher reported that their efforts proved less than rewarding when the team never responded. NGS does send teachers an updated team list after the beginning of the session so that they will know if any teams have dropped out or rolled over into a different session.

Individual teachers are primarily responsible for encouraging their teammates to send all of their data. NGS reminds classes, through brochures and group letters, to meet their deadlines or contact their teammates if they cannot. And a postcard is sent to teachers who do not telecommunicate their initial information by the deadline offering assistance or the opportunity to transfer to a later session. However, NGS does not contact teachers when other deadlines are missed.

It is unclear to what extent the problem is technology-related and how much may be due to a lack of individual class follow-through. One Iowa teacher, for example, related that his class had completed their community letter on time, but initially had been unable to telecommunicate it to their teammates. It is not unlikely that similar technical problems have interfered with other classes' efforts, while some classes have, in all likelihood, simply not completed the activities. Because NGS does not monitor this situation, no records are available.

Although the Iowa teachers still want to participate in KN again, the less than expected team response rate has been the most serious and consistent criticism of the program. At one school, the project teachers said that they were exploring alternate telecommunications projects because of this problem. This problem was mentioned to an evaluator during all of the site visits and it was usually one of the first points made. It was also mentioned in several notes sent to the evaluators.

Software Records kept by the Hotline staff (see Appendix IV) reveal that there are other technology problems, some of which can be attributed to teacher's inexperience with the technology, e.g. disk mix-ups between teachers within a school or incorrect entry of team names. Others were due to poor telephone connections. But there are also several problems that are due to defects in the KN software -- messages indicating that teachers had exhausted all of their telecommunications time and disks that did not work correctly.

The most significant software-related technical problem is this expiration of "network time." When classes receive a telecommunications subscription for a KN unit it provides them with 120 minutes of on-line time. According to NGS this should be more than adequate to allow classes to complete all unit activities. Whenever a class telecommunicates, they are informed of how much of this time remains. Due to some type of software malfunction teachers were frequently informed that their network time had expired when, in fact, it had not. According to Liz Hossli, Hotline Customer Service Representative, teachers typically either had no problems with expired time or this occurred to them three to four times over the course of a given unit.

While NGS is aware of the problem and restores time to accounts, teachers reported during interviews that when it occurred this process was both annoying and time consuming for them. Lucy Hagan, Teacher Training Coordinator of Kids Network, stated that NGS is working to resolve the problem in a completely satisfactory way. They have identified the source of the problem and have developed a solution that they feel will be satisfactory. However, they need to test the solution over the summer when the Network is not running. It is their hope that this malfunction will be resolved prior to the fall session.

There are other software problems that occur less frequently, some of which are a nuisance, but do not interfere with telecommunication and others that are more serious. For

example, one nuisance error occurs when the system is unsure where to place the class on-line history (the frequency and use of network time). Another problem mentioned to the evaluator during several site visits relates to malfunctioning tutorial disks (NGS reported that a revised disk was mailed to all project teachers in September). These also do not interfere with telecommunication.

However, an "input/output" error is fatal, meaning that the user requires a new program disk. Some of the teachers interviewed reported being unable to send or receive data until their disk problems were resolved. While these teachers were generally impressed with the level of attention received from the Hotline, the problems often took hours of their time.

NGS sent bulletins to all KN teachers to address several of the most common user and software errors, e.g. network time expired, disk file problem 43 (too many characters in the file name of a letter), and the use of multiple disks with one computer.

Summary The data from teacher surveys, interviews, and evaluator observations suggest the following with respect to teachers' understanding and acceptance of, and appreciation for, technology-based instructional programs as a result of participating in the project:

1. Teachers became more comfortable with instructional technology as a result of participating in the project.

2. Teachers developed an appreciation for an expanded use of technology to support instruction as a result of their participation in the project.

3. Teachers found the KN Hotline to be a generally useful resource, although the service was not consistent throughout the year.

4. The telecommunications response from teammates was inconsistent and unpredictable.

5. The KN software has defects some of which create inconveniences for teachers and others which interfere with telecommunications.

Students: How did students' interest in, understanding of, and comfort with technology change as a result of participating in the project?

Comfort and Value Pre project survey data revealed that students entered with positive feelings about using computers. Most had, in the past, used them primarily for games and in educational contexts. A fair number of the students had used word processing or paint/draw programs, but only a very small number indicated that they had telecommunicated. There were some indications of differences in computer use between the F/F and F/S students, but there were no clear patterns. Fourth graders were generally more positive about computer use than were either fifth or sixth graders.

Students maintained their enthusiasm throughout the course of the project. Students reported on the post-project survey that they enjoy working with computers "a lot" and felt that they were easy to use. They were about evenly split when asked if they had enough chances to use the computer during the units. And based on survey and interview data, it would appear that the students expanded their view of the uses of technology. There was a very positive response to the survey question that asked

them how they felt about using the computer to send letters and information to students in other schools.

When students were asked during interviews how they would describe KN to another student, they generally first mentioned that it was a program in which you talked with, and learned about, students in other schools and communities. They did not, as anticipated by the evaluators, typically begin with a description of the technology. These are indications that in KN, technology meets the goal of serving as an instructional support rather than an end in itself.

Telecommunications Deadlines The poor participation rate of other teammates was the greatest disappointment to the students; they frequently mentioned the problem during their interviews. One frustrated student commented that NGS should figure out which schools are really going to do the units; "his" school in California had never sent their data.

Summary In summary, the data from student surveys, interviews, and evaluator observation suggest the following about students' understanding of, and comfort with technology as a result of their participation in the KN units:

1. Students are enthusiastic about using the technology as part of their work on the KN units.
2. The technology does not distract the students from the instructional focus of the KN units.
3. Students are disturbed by the incomplete telecommunications response of their teammates

Question #3: Management

How effectively were teachers able to manage the components of the Kids Network program?

Most teachers knew very little about the details of KN prior to the inservice. Pre-project survey data indicate that they had some vague sense of the program's goals and objectives, but no clear understanding as to the specifics of instruction and how they would manage the internal components of the program or integrate it with the rest of their curriculum.

Many, in pre-project interviews and in conversations and questions during the inservice, wondered how much time the program would take. Furthermore, other teacher comments during the training sessions indicated that those who were teaming, e.g. science and social studies teachers, classroom teacher and media specialist, had not yet planned how they would share responsibilities. Similarly, those who had more than one section of science and/or multiple grade levels had not determined with whom they would/should use the program.

Yet, in spite of this lack of familiarity with the program, teachers entered with high hopes and expectations. Survey data show that they believed, for example, that KN would help them to achieve their learning goals in areas other than science.

Despite their initial lack of information, teachers reported on the post-project survey that they were moderately or highly successful in coordinating all components of the program.

Moreover, in teacher interviews, most teachers expressed confidence that they would be highly successful their second time through the program [next year].

Manual On the post-project survey, teachers uniformly reported that the teachers' manual was moderately or very important to the success of the KN units.

Further support for the manual came out during interviews. Teachers said that the manual was clear and well organized, easy to use and served as an excellent resource and support.

One of the strengths of the manual cited by teachers during interviews is that while a structure and lesson-by-lesson plan are provided, there is ample room for customizing to match the instructional needs of particular students and the teaching style of a given teacher. When an evaluator visited classes, no teachers were running the program in an identical fashion and, in fact, one departmental science teacher, who used KN with seven sections, was using different variations with different groups. The approaches used by different teachers ranged from more traditional teacher-directed to very student-centered learning stations, with most using an interpretation that was quite student-centered. Teachers were observed expanding, supplementing, and personalizing the lessons with local and national newspapers, magazine articles, movies, etc. In referring to the flexibility of the manual one teacher commented that, "sometimes you forget what's your idea and what is from the manual."

Classroom Organization The units were taught by teachers of varying specialties in numerous configurations. Many of the teachers taught the units on their own. In other cases the lessons were team taught. In a number of schools different teachers took responsibility for different portions of the units. For example, when a science teacher and media specialist teamed up, the science teacher was responsible for the majority of instruction and the media specialist contributed in her areas of strength, e.g. research and reference skills, and use of the computer.

The majority of project classes observed made at least some use of heterogenous cooperative groups. Special education and Chapter I students were integrated into these groups, and during site visits their presence was never noticeable to the evaluator (a veteran special education teacher). Teachers indicated on the post-project survey that most of the unit activities were appropriate for students with special learning needs.

Conversations during the site visits confirmed the utility of the units with heterogenous groups. As one teacher put it,

> They [KN units] don't discriminate between slow and above average students; both gain from them. All excel because it is hands-on and they can see and do. This is not just for one type of student.

Other teachers commented that because of the high interest level of the lessons, the hands-on nature of the program, and the variety of kinds of activities, the program worked well with all types of students. In fact, in one school, the classroom teacher reported that the LD teacher had come to observe on at least

three separate occasions because she was so impressed with how the program works with "her kids."

Unit Length Teachers (and students) did not agree on an ideal unit length. No survey data were available regarding this issue, but the topic frequently came up during site visits. While some commented that the units were too long and dragged a bit, others felt that there was not sufficient time to complete all the activities and meet telecommunication's deadlines. This discrepancy appears to depend, in part, on the classroom configuration (self-contained vs. departmental), the grade level, and the extent to which the teacher supplemented the basic lessons.

Teachers in self-contained classrooms could extend the length of KN lessons or integrate parts of the lessons into other content areas, e.g. math, reading, and language arts. Therefore, they had more time to work on the activities and KN could be interwoven into their entire school day. However, teachers in departmental programs had a strictly defined period in which to work on the activities and they could only overlap into other content areas if they made special arrangements with another teacher. Departmental teachers, therefore, were more likely to feel time pressures to meet telecommunication deadlines.

There was some indication that teachers were more likely to think that the Acid Rain unit was too short. Teachers commented that it was difficult to complete all of the unit activities and meet the telecommunications deadlines for it.

Inservice Training Without exception, project teachers confirmed the importance of the two days of inservice training. Although departmental science teachers and those high on the "KN approach index" entered the program more knowledgeable, experienced, and comfortable with the KN approach, survey data reveal that by the end of the workshop, all significant differences had disappeared. This is illustrated in the chart that follows.

Teacher Surveys
Preproject/Post Inservice Comparisons

Question	Pre-project	Post-Inservice	Level of Significance
How well prepared are you to teach your students to use the computer and technology in the KN units?	1.94	3.51	.00
How well prepared are you to teach your students the information and skills presented in the KN units?	1.98	3.40	.00
How well prepared are you to teach the procedures for collecting and sharing data?	2.23	3.48	.00
How well prepared are you to coordinate the various components of the KN units?	1.85	3.28	.00

Many teachers commented during interviews that without this training it would have been difficult, or even impossible to successfully implement the units. Principals observed that upon returning from the inservice, the teachers were enthusiastic and knowledgeable about the program.

When interviewed teachers were asked how the inservice could have been improved, several commented that an additional day of training would have been helpful for those who were technology

novices. Others said that it would have been useful to learn more about what could go wrong with the technological components of the program so that they would have been better prepared to deal with them. Some teachers, for example, discovered belatedly that it was crucial to turn off the computer before using a second teacher's data disk. They could have saved time and avoided frustration if this had been emphasized in the training and/or the software guide.

Collegial Support Teachers also enthusiastically endorsed the Carver project design of having two teachers per building using the units. On the post-project survey, teachers rated support from the other project teacher equal in importance to that they received from the KN Hotline. Interestingly, those with the most years of classroom experience were the most likely to value their colleague's assistance.

The significance of collegial support was a common thread in the teacher and principal interviews. Teachers mentioned the importance of having someone with whom to problem solve and share ideas. One teacher said, "If I had to do it all alone it would have been highly frustrating."

Collegial support was valued so much that a number of teachers commented that it also would have been quite helpful if they could have telecommunicated with the other Iowa project teachers, as well as the teachers from their teams. This would have facilitated problem solving and the exchange of lesson ideas and information.

Grade Appropriateness Conflicting opinions were expressed regarding the appropriateness of all units for students in grades four through six. While survey data indicated that most teachers would use the Hello unit when starting with a new class, during interviews most teachers said that both units were not appropriate for students in fourth, fifth, and sixth grade. The overwhelming majority of these teachers felt that the content of the Hello unit was better suited for fourth graders and that Acid Rain would be more appropriate in fifth or sixth grade. Teachers (including several who taught several different grade levels) commented that the concepts presented in the Acid Rain unit were too difficult for the average fourth grade class. In fact, in planning for next year, many of the schools visited reported that they had decided to use the Hello unit in fourth grade, and the Acid Rain and one other KN unit in fifth and sixth. Given these contradictions, it would be useful to take a closer look at the issue of grade appropriateness of the units.

Team Participation As discussed in the section on question #2, the major criticism teachers have of KN was the erratic participation of their teammates. In addition to the resulting problems cited earlier, this also complicated program management for the teachers. In order to effectively organize the class to collect and analyze the data from 10-15 other classes, most teachers divided their students into teams. Each team took primary responsibility for another school and became the "expert" for that school. For example, Group I might have been

responsible for teammates in Urbana, IL; Group II could have been assigned Denver, CO; and so on. Therefore, when one of the schools did not send their data, the group assigned to that school had no data to collect and analyze. In such cases, the teacher had to assign multiple groups to the same school, necessitating last minute modification of the management scheme. Because more than one group was then responsible for the data from some schools, individual groups lost their special status as the sole expert on another school team.

Summary The data from teacher surveys, interviews, and evaluator observation suggest the following with regard to teachers' ability to manage the components of the KN units:

1. Teachers felt that they had been successful in coordination of the multiple components of KN.
2. Teachers felt that the teachers' manual was useful, clear, and well-organized, while also leaving them flexibility in lesson planning.
3. Teachers found that most unit activities could be used successfully with heterogenous groups of students.
4. Teachers did not agree on the ideal length of the units.
5. Teachers were unanimous in their strong endorsement for the two days of inservice training.
6. Teachers valued the support of their fellow project teacher.
7. Teachers expressed conflicting opinions regarding the appropriateness of all units for all grades (4-6).
8. Teachers found that the erratic participation of their teammates created last minute organizational problems.

Question #4 Integration

To what extent was the program integrated with the rest of the class and school curriculum?

Interdisciplinary Approach Teachers indicated on the post-project survey that the interdisciplinary approach of KN contributes to the success of the units. They also believe that the units helped them to some extent in reaching their learning goals in areas other than science. Interviews and observations suggest differences, based on classroom organization, in the interdisciplinary use of the unit activities, but survey data did not confirm that.

During school visits, teachers in self-contained classrooms reported and demonstrated that integration of the unit activities across the curriculum is both natural and effective. For example, in one class the evaluator observed KN activities during a specified 45-minute period, but also later in the day during a math period, when students worked on techniques for rounding and averaging their family car mileage (an activity in the AR unit). In another class the teacher reported that the community letters had been written as part of a language arts lesson. Letter writing was a part of their fifth grade language arts curriculum and so the activity meshed well for them.

While teachers in self-contained classes related the ease of integrating KN activities across content areas, teachers interviewed in departmentalized programs said that it is more difficult for them. Because the departmental structure imposes

difficult for them. Because the departmental structure imposes time and content barriers these teachers were forced to rely on the interest and willingness of their colleagues. As one departmental teacher pointed out, "They [other teachers] are worried about KN using up all of their class time."

These limited and inconclusive findings suggest the need for further investigation in this area.

Dissemination Another goal of the project was to encourage the dissemination of this and other innovative teaching methods related to science and geography to other Iowa schools. Dissemination of information about KN has already occurred in most of the sites in a variety of formats; teachers reported on the post-project survey that they have shared information with other teachers in their building, school board members, parents, and colleagues from other schools and districts.

Non-project teachers have asked and received information about the project and program, as well as the specific materials. In many cases the project teacher was observed by a colleague, and there have been numerous demonstrations of the software and the telecommunication process. In some schools, non-project teachers have even become directly involved in instruction, with the project teacher serving as a peer coach.

During interviews, an evaluator learned more about the activities that teachers and students have been involved in as they share information about KN. One class, for example, produced a multimedia videotape for parents, other teachers, and

school board members, using a news magazine format. Several teachers have participated in sessions on KN at regional and statewide conferences. The teacher team from one school was interviewed on a television program produced by their AEA and broadcast throughout the region. One of the other AEAs had a feature about the project in their newsletter and in some towns there were articles about the project in the local newspaper.

Summary The data from teacher surveys, interviews, and evaluator observations suggest the following:

1. Teachers feel that the interdisciplinary approach of KN contributes to its success. There are mixed findings with respect to the ability of teachers in different school organizations to integrate the activities across content areas.

2. Teachers have shared information about the KN program and the Carver project with colleagues within their school, their district, and their region and with parents, school board members, and the community at large.

Question #5: Conditions

Is the program more effective for classes that use only one unit per semester as opposed to those who participate in two units per semester?

This study also sought to determine whether the KN program is more effective with, and satisfying for, teachers and students who participate in one, rather than two, units per semester. Teachers and students had the opportunity to address this question on the post-project surveys.

There were no significant differences in perceived student learning between the F/F and F/S group. While teachers in both groups expressed equal satisfaction with the program, students in the F/S group were more interested than those in the F/F group in doing additional units in the future.

In planning for the future, teachers overwhelmingly expressed a preference for using only one unit per semester. On the psot-project survey, 34 of 49 teachers indicated that they would rather use one unit per semester than two units per semester (4), or one unit per year (10). Therefore, while teachers were enthusiastic about the learning experience that occurred when using two units in one semester, they would opt to schedule the units differently a second time.

V SUMMARY AND RECOMMENDATIONS

Summary of Findings

The National Geographic Society states that seven elements of KN make the network "special" (Teacher's Guide). They are investigation, collaboration, geography, computer skills, interdisciplinary approach, cooperative learning, and critical thinking. The findings of this evaluation confirm this assertion and the overall success of the program. Teachers' general satisfaction with the program is captured in their responses to two questions on the post-project survey:

Would you use the Kids Network units again?

Would you recommend the Kids Network units to a colleague?

Of the 49 responding teachers, 46 said that they would use it again and two indicated that they might. The same number said that they would recommend the program to a colleague. The evaluation identified the major strengths of the Kids Network program:

1. Students learn about science as a result of participating in the program, particularly about specific scientific concepts and procedures.
2. Students develop global awareness as a result of participating in the program.
3. Teachers and students learn to use and value technology as an instructional tool.

The areas of the program which could be strengthened are:

1. Activities to promote student learning about the process of scientific thinking are less effective than

those relating to specific scientific concepts and procedures.

2. Teams are inconsistent in their telecommunication response rate.

3. There are flaws in the KN computer software that waste teacher time and interfere with telecommunicating.

The evidence gathered in this evaluation strongly suggests that KN was enhanced by the staff development approach used in the project. Key elements of the approach were:

1. Teachers were provided with two days of intensive inservice training.

2. Teachers worked in pairs within their schools.

Recommendations

Three types of recommendations are given in the following pages:

- Direction for modification and refinement of the Kids Network program by National Geographic Society;
- Suggestions for further evaluative study in order to expand upon and generalize the results of this study; and
- Planning considerations for schools considering the use of Kids Network.

These recommendations are subject to certain limitations.

- Students participated in two of the four existing KN units.
- All schools were given the necessary hardware, software, and telecommunications subscriptions at no cost and teachers received a $100 stipend for attending the inservice training.
- The evaluation is based predominantly on the self-reports of teachers and students.

- This study focused primarily on teachers and more generally on students.

- This evaluation was conducted at a distance, with one-day site visits to six of the 28 participating schools.

The recommendations are organized and then summarized by the four general study questions. However, one recommendation cuts across all four questions.

- While representative of Iowa, this study does not reflect conditions of U.S. schools in general. In order to generalize these results it will be necessary to replicate the evaluation in other contexts, e.g. in more urban environments, in larger school districts and in other rural contexts in other states. The evaluation instruments in the appendices might serve as a starting point for further studies.

Content, Skills, & Strategies

Both teachers and students felt that they had benefitted by their participation in the program. They were positive about the scientific content in the units and the skills and strategies used to learn about that content.

However, a suggested modification to be made by NGS is:

- According to the self-reports of both teachers and students, students learned more about the specific science concepts and procedures than the process of scientific thinking. NGS may want to investigate this difference and focus on ways of improving learning across all dimensions. It would be useful to explore modifications or additions to the teachers' lessons or the student activities.

Areas for further study are:

- This evaluation does not include a direct assessment of student performance or capacity in content, skills, or strategy use. (An initial attempt to develop one small measure was unsuccessful due to low reliability.) Further direct study of what students do learn and what capacities are developed is indicated. This might be accomplished in a number of ways including a test, a performance, or a portfolio.

- Findings in this evaluation suggested differences in learning and interest for students across grade levels.

Further investigation of these grade level differences is recommended.

Technology Use

Teachers and students were quite positive about their use of the technology in the KN units. They learned to use technology in new and expanded ways as a tool to support instruction.

There are, nonetheless, suggested modifications to be made by NGS:

- They should explore and develop ways to increase class participation. Teachers' and students' greatest disappointment with the program was the inconsistent telecommunication participation of their teammates. National Geographic should monitor participation of subscribing classes to determine whether this problem is due to technical flaws or a lack of teacher follow through. Any technical problems should be corrected and teachers should be contacted if they do not meet their telecommunications deadlines. This is a complex problem due the voluntary nature of participation in the program, and one that will present a substantial, but worthy, challenge to NGS.

- Computer software plays a key role for both classroom based activities and telecommunication of data to teammates. While the software is generally well received, there are some remaining problems that interfere with its effective use. National Geographic should study and correct these software defects.

Management

Teachers were satisfied with their ability to manage the multiple components of the KN program.

Suggested modifications to be made by NGS to enhance teacher management are:

- Teachers in the Carver project gave their overwhelming endorsement to the inservice training provided by NGS. The materials and methods used were part of a NGS field test. While this study is not conclusive, it provides strong evidence that National Geographic should be encouraged to continue development and expand their use of the training materials.

- One of the most valued elements of KN is the communication with students in other communities. It would be similarly valuable if teachers could

telecommunicate with the other teachers on their team and throughout the network. This would allow them to share teaching strategies, enhance unit activities, and gain information regarding the status of data. NGS has already begun exploring this option and should be encouraged to proceed in that direction. This is not a simple matter as it would need to be developed in a manner that produced a network that was both beneficial and cost effective for participants.

School planning considerations with respect to management include:

- Evidence to date does not indicate differences in student learning whether classes participated in two units during a single semester or whether they were spread out over the entire year. However, preliminary data show that, for reasons not yet examined, teachers and students have a strong preference for the use of only one unit per semester. Schools planning to use KN should give careful thought to this finding as they make their instructional plans.

- All data indicate that teacher inservice was very important to the success of the program. Schools planning to use KN should give serious consideration to the inclusion of such sessions.

- Teachers placed great value on the collegial support they received by the other project teacher in their school. Schools planning to use KN should consider the significance of having more than one teacher participating in the units.

- Teachers reported that they could not depend on complete participation by their teammates. This problem should be anticipated by teachers as they plan how to organize their lessons.

Integration

Teachers felt that they could use KN to achieve their general learning goals in science as well as to achieve learning goals in other content areas.

Yet, there is a need for further study:

- This evaluation did not examine the extent to which KN was integrated into the broader science curriculum or into other instruction. Nor did it examine the variety of ways in which this integration was achieved. Further study in this area would be useful to inform

NGS as it refines the program and to help practitioners plan to most effectively use KN.

- One of the goals of KN is to integrate learning across curricular areas. To the extent that this is achieved with KN it will be important to examine the impact of such integrated learning on student achievement.

- There was some evidence of differences between interdisciplinary use of KN by teachers in self-contained and departmental programs. It suggested that teachers in self-contained classes were able to integrate instruction, but that those in departmental structures, who taught only one subject area, were less likely to do so. It will be helpful to more thoroughly evaluate this difference.

In summary, this evaluation study found that the Iowa Kids Network project was a success for the Iowa teachers and their students. At this point the National Geographic Society can leave the program as is, or through further development and refinement, create an even stronger program. For NGS, the evaluation must be considered very heartening. We would encourage them to continue to develop, refine, and evaluate the program. The results are convincing enough that other Iowa educators should consider the Kids Network as an innovative instructional option. This evaluation found several ways in which Kids Network could be enhanced. In order to improve student learning, it would be worthwhile for NGS to strengthen the activities that help students to use the scientific thinking process. Beyond the specific content of the lessons and the student-teacher interactions, the success of the program is dependent, in large measure, on the participation of teammates from other schools. Increasing the likelihood that classes will send their data, and

expanding the number of international sites would greatly strengthen the KN. As part of that effort, software should be refined to eliminate the remaining flaws and make it more reliable for all participants. Finally, in keeping with the telecommunications approach to student communication, teachers on the network could also be linked electronically in order to work collegially.

Schools that are considering using the Kids Network should be aware that it appears to be instructionally effective whether one or two units per semester are used, but they should ask how KN will fit into their particular classrooms and school curriculum. They should seriously consider the use of both inservice training and teacher teams as means of increasing the effectiveness of the program.

APPENDICES

I Project Application Form

II Teacher and Student Surveys and Student Test

III Results of the Teacher and Student Surveys

IV Site Visit Protocols and Hotline Form

Appendix I Project Application Form

Roy J. Carver Charitable Trust
National Geographic Kids Network Project
Application, Part 1 Selection

School District Number	
School Building Number	
Has your school ever used National Geographic Society Kids Network?	Yes / No
Which Area Education Agency serves your school district?	
Percentage of building student enrollment - minority (October 1989)	
Percentage of building student enrollment - Free/Reduced Lunches (October 1989)	
Total district enrollment	
Total building enrollment	

Roy J. Carver Charitable Trust
National Geographic Kids Network Project
Application, Part 2 Administrative Contact Information

District Name _____ No. _____

Building Name _____ No. _____

Identify the administrative contact for this project.

Name: _____

Title: _____

Summer Phone Number: (_____) _____

Summer Address: _____

_____

School Phone Number: (_____) _____

School Address: _____

_____

_____

_____

Signature to indicate interest in this project (principal or superintendent)

Does your school have a direct outside phone line (a phone line that does not go through a voice operator)? Yes No

How accessible is this phone line to the classroom(s)?

_____

_____

Roy J. Carver Charitable Trust
National Geographic Kids Network Project
Application, Part 3 Teacher 1 Contact Information

District Name _____ No. _____

Building Name _____ No. _____

Identify one teacher (Grades 4-6) to participate in the project.

Teacher Name: _____ Grade: _____

Summer Phone Number: (_____) _____

Summer Address: _____

_____

School Phone Number: (_____) _____

School Address: _____

_____

_____

Signature to indicate interest in this project.

Have you used an Apple IIe or IIc? Yes No

Have you used an Apple IIgs? Yes No

Have you used a Macintosh? Yes No

Have you used a mouse? Yes No

Have you used a modem? Yes No

If yes, please identify brand/model: _____

Please briefly summarize your past and present computer use:

Roy J. Carver Charitable Trust
National Geographic Kids Network Project
Application, Part 4 Teacher 2 Contact Information

District Name _____ No. _____

Building Name _____ No. _____

Identify one teacher (Grades 4-6) to participate in the project.

Teacher Name: _____ Grade: _____

Summer Phone Number: ( ) _____

Summer Address: _____

_____

School Phone Number: ( ) _____

School Address: _____

_____

_____

Signature to indicate interest in this project.

Have you used an Apple IIe or IIc? Yes No

Have you used an Apple IIgs? Yes No

Have you used a Macintosh? Yes No

Have you used a mouse? Yes No

Have you used a modem? Yes No

If yes, please identify brand/model: _____

Please briefly summarize your past and present computer use:

Roy J. Carver Charitable Trust
National Geographic Kids Network Project
Part 5 Science Program Information

Please note:
Answers to the following questions are not to be used in selecting schools for the project. The information is needed for planning staff development workshops and on-going support for the selected participants.

Science Program: Check the statements that are true of your school building.

_____A science specialist teaches all science classes.

_____The homeroom teacher teaches science and other basic subjects.

_____A science specialist assists other teachers with science.

_____Science is taught at specific times according to a firm schedule.

_____Teachers may vary the length of a science class as needed.

_____Teachers often lead hands-on experiments in science class.

_____Students are expected to cover the topics in a certain science textbook in the course of a year.

Return by June 1 to:

Becky Timmerman
Technology Consultant
Bureau of Instruction and Curriculum
Department of Education
Grimes State Office Building
Des Moines, Iowa 50319

(515) 281-4803

Appendix II Teacher and Student Surveys and Student Test

Teacher Survey
Preproject

Social Security Number: _ _ _ _ _ _
(last 6 digits only)
Sex: M F
Total Years Teaching Experience: _____
Highest Level of Education: B B+15 B+30 M M+15 M+30 D
Area of Degree: _____
School: _____
Grade/Subject: _____

1. Indicate your level of use/expertise with the following hardware:

Hardware	Never Used	Novice	Intermediate	Experienced
Apple IIGS	1	2	3	4
other computer(s)				
_____	1	2	3	4
_____	1	2	3	4
mouse	1	2	3	4
modem	1	2	3	4

2. Indicate your level of use/expertise with the following types of software:

Software	Never Used	Novice	Intermediate	Experience
word processing	1	2	3	4
spread sheet	1	2	3	4
data base	1	2	3	4
communications	1	2	3	4
instructional software	1	2	3	4
computer games	1	2	3	4

3. How many computers did you have in your classroom on a full-time basis prior to the Kids Network project? ___

4. How many computers did you have in your classroom on a part-time basis prior to the Kids Network project? ___

5. How many times per week did your students go to a computer lab? _

If you answered 0 to questions #3-5 skip to question #11.

6. How much time did a typical student spend on the computer during typical week last year?

___ more than one hour
___ 30 minutes to one hour
___ less than 30 minutes

7. How often did you, the teacher, use the computer during a typical week last year?

___ daily
___ several times a week
___ less than once a week
___ not at all

8. Indicate the subject areas for which your students used the computer (check all that apply):

___ math
___ science
___ geography/social studies
___ reading/language arts
___ other

9. Indicate the ways in which your students used the computer (check all that apply):

___ drill and practice
___ problem solving
___ word processing
___ communication with other students (using modem)
___ graphics
___ games
___ simulations
___ graphing

10. Indicate the ways in which you, the teacher used the computer (check all that apply):

___ word processing
___ record keeping
___ spread sheet
___ data base
___ communications (using modem)
___ other _____

11. Do you have a computer in your home?

___ yes
___ no

If you answered no to question #11, skip to question #13.

12. How long have you had a home computer?

___ less than a year
___ 1-2 years
___ more than 2 years

13. How often do you use your home computer?

___ daily
___ several times a week
___ less than once a week

14. Please indicate your level of teaching expertise with the follow content, skills, and strategies:

	Minimal	Moderate	Considerable
acid rain	1	2	3
acids/bases/pH scale	1	2	3
map skills	1	2	3
graphing skills	1	2	3
finding patterns in science data	1	2	3
scientific research methods	1	2	3
predictions/hypothesis	1	2	3
letter writing	1	2	3
computer skills	1	2	3
critical thinking	1	2	3
cooperative learning	1	2	3
hands-on science	1	2	3

15. Before you arrived today how much information did you have about the goals and objectives of the Kids Network units?

___ none at all
___ a basic idea
___ moderate understanding
___ thorough understanding

16. Before you arrived today how much information did you have about how computers and technology will be used in the Kids Network units?

___ none at all
___ a basic idea
___ moderate understanding
___ thorough understanding

17. How well prepared are you to teach your students to use the comput er and technology in the Kids Network program?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

18. How well prepared are you to teach your students the information and skills presented in the Kids Network units?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

19. How well prepared are you to teach the procedures for collecting, analyzing, and sharing data?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

20. How well prepared are you to coordinate the various components of the Kids Network units?

___ not at all
___ minimally prepared
___ moderate prepared
___ well prepared

21. To what extent do you think the Kids Network units will help you reach your students' learning goals in areas other than science?

___ not at all
___ little
___ somewhat
___ very much

22. Are you responsible for teaching the students who will be using t Kids Network units a science curriculum <u>beyond</u> what is covered ir the Kids Network units?

___ yes
___ no

Teacher Survey
Post Inservice

Social Security Number: _ _ _ _ _ _
(last 6 digits only)
Sex: M F
Total Years Teaching Experience: _____
Highest Level of Education: B B+15 B+30 M M+15 M+30 D
Area of Degree: _____
School: _____
Grade/Subject: _____

1. How well do you understand the goals and objectives of the Kids Network units?

___ not at all
___ basic understanding
___ moderate understanding
___ thorough understanding

2. How well do you understand the role of computers and technology in the Kids Network units?

___ not at all
___ basic understanding
___ moderate understanding
___ thorough understanding

3. Rate the importance of the following goals of the Kids Network:

	Not Important	Moderately Important	Very Important
students explore real & engaging scientific problems	1	2	3
students understand that science is a cooperative venture	1	2	3
students participate in inquiry-oriented, hands-on science	1	2	3
students develop science process skills	1	2	3
students use the computer to record, receive, and share information	1	2	3
students activities are interdisciplinary	1	2	3
students learn mapping skills about communities different from their own	1	2	3

4. How well prepared are you to teach your students to use the computer and technology in the Kids Network program?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

5. How well prepared are you to teach your students the information and skills presented in the Kids Network units?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

6. How well prepared are you to teach the procedures for collecting and sharing data?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

7. How well prepared are you to coordinate the various components of the Kids Network units?

___ not at all
___ minimally prepared
___ moderately prepared
___ well prepared

8. To what extent do you think the Kids Network units will help you to reach your students' learning goals in areas other than science?

___ not at all
___ little
___ somewhat
___ very much

9. Do you plan to use the Kids Network units as:

___ special science activities
___ unrelated to your regular science program
___ a supplement to your regular science program
___ an integral part of your regular science program
___ a replacement for your regular science program

10. How many days per week do you plan on using the Kids Network activities?

___ 5
___ 4
___ 3
___ 2
___ 1

Teacher Survey
Post Project

Your answers to this survey are confidential. Your individual responses will not be shared with anyone; all reporting will be of group data. Please remember that this is an evaluation of the NGS Kids Network and NOT an evaluation of your teaching.

Thank you for helping us with this research!

Social Security Number: _ _ _ _ _ _
(last 6 digits only)
Sex: M F
Total Years Teaching Experience: _____
Highest Level of Education: B B+15 B+30 M M+15 M+30 D
Area of Degree: _____
School: _____
Grade/Subject: _____
Class type: self-contained departmental

1. How well do you understand the goals and objectives of the Kids Network units?

___ not at all
___ basic understanding
___ moderate unde standing
___ thorough understanding

2. How well do you understand the role of computers and technology in the Kids Network units?

___ not at all
___ basic understanding
___ moderate understanding
___ thorough understanding

3. Rate the importance of the following goals of the Kids Network:

	Not Important	Moderately Important	Very Important
students explore real & engaging scientific problems	1	2	3
students understand that science is a cooperative venture	1	2	3
students participate in inquiry-oriented, hands-on science	1	2	3
students develop science process skills	1	2	3
students use the computer to record, receive, and share information	1	2	3
students activities are interdisciplinary	1	2	3
students learn mapping skills about communities different from their own	1	2	3

4. Please rate your ability with the following elements of the Kids Network units:

	low	minimal	moderate	hig
computer/technology	1	2	3	4
coordination of components e.g. data collection, management strategies, instructional strategies, computers	1	2	3	4
data collection	1	2	3	4

5. Please rate the contribution of the following components to the success of the Kids Network units:

	not important	minimally important	moderately important	very important
telecommunicating	1	2	3	4
computer software	1	2	3	4
student research	1	2	3	4
research teams (classes in other schools)	1	2	3	4
inservice training	1	2	3	4
teachers manual	1	2	3	4
student worksheets	1	2	3	4
student activities	1	2	3	4
extension activities	1	2	3	4
interdisciplinary approach	1	2	3	4
cooperative learning	1	2	3	4
critical thinking	1	2	3	4
unit scientist	1	2	3	4
Kids Network hotline	1	2	3	4
unit topics	1	2	3	4
Hello unit (intro)	1	2	3	4

6. While using the Kids Network units did you get technical support from (please check all that apply):

___ the other project teacher
___ other staff at my school
___ district technical specialist
___ regional technical specialist (AEA)
___ Kids Network hotline
___ other _____

7. If you received technical assistance, who provided the most useful support?

___ the other project teacher
___ other staff at my school
___ district technical specialist
___ regional support person (AEA)
___ Kids Network hotline
___ other _____

8. To what extent did the Kids Network units help you to reach your learnin goals for your students in science?

___ not at all
___ little
___ somewhat
___ very much

9. To what extent did the Kids Network units help you to reach your learnin goals for your students in areas other than science?

___ not at all
___ little
___ somewhat
___ very much

10. How did you use the Kids Network units:

___ special science activities unrelated to your regular science program
___ as a supplement to the regular science program
___ as an integral part of the regular science program
___ as a replacement for the regular science program

11. How many days per week did you use the Kids Network unit activities?

___ 5
___ 4
___ 3
___ 2
___ 1

12. Indicate which of the extension activities you used with your class:

Hello Extensions	Used	Did not use
Sending extra letters to teammates	1	2
Exchanging objects with teammates	1	2
Making pen pals with research teammates	1	2
Making a graphing bulletin board	1	2
Graphing pet data from the research team	1	2
Exchanging letters with teammates on surprising pet data	1	2
Collecting additional pet data	1	2
Discussing possible biases of the network sample	1	2
Making a mapping bulletin board	1	2
Acid Rain Extensions		
Sending extra letters to teammates	1	2
Testing pH of different brands of the same liquid(s)	1	2
Making your own pH paper	1	2
Making a poster size pH scale	1	2
Charting pH of local rainfall	1	2
Testing pH at beginning and end of the same rainfall	1	2
Comparing pH of rainfall collected from different places	1	2

	Used	Did not use
Tracking the movement of rain storms	1	2
Recording students families' use of cars	1	2
Tabulating data on car use	1	2

13. Would you use the Kids Network units again?

___ yes
___ maybe
___ no

14. If you use the Kids Network units again would you prefer to:

____ use only one unit during the entire school year
____ use two units during one semester
____ use only one unit per semester

15. Would you consider teaching some of your other science units using the Kids Network approach (e.g., original research, interdisciplinary, cooperative learning)?

___ yes
___ maybe
___ no

16. Would you recommend the Kids Network units to a colleague?

___ yes
___ maybe
___ no

17. Please check all that apply:

___ Other teachers have asked me about the Kids Network project
___ Other teachers have observed my class while we were using the Kids Network units
___ I have demonstrated the software to other teachers
___ I have demonstrated telecommunicating to other teachers
___ I have shared materials from the project with other teachers in my building
___ I have shared information about the project with teachers from oth buildings in the district
___ I have shared information about the project with teachers outside my district

18. Did you teach any other science units during the last 4 months?

___ yes
___ no

19. If yes, how many days per week did you teach non-Kids Network science curriculum?

___ 5
___ 4
___ 3
___ 2
___ 1

20. How would you rate the level of support of your principal in this projec

____ high
____ moderate
____ minimal

21. How many of the telecommunications deadlines were you able to meet?

___ all
___ most
___ some
___ few
___ none

22. How many of the telecommunications deadlines did the other members of yc Kids Network research team meet?

___ all
___ most
___ some
___ few
___ none

23. On average, how many times per unit did most students get to use the computer?

___ none
___ 1
___ 2-4
___ 5-7
___ 8 or more

24. How many of the unit activities were appropriate for students with speci learning needs?

___ all
___ most
___ some
___ few
___ none

25. If you were to use the Kids Network with a new class, would you start wi the Hello unit?

___ yes
___ maybe
___ no

26. Do the majority of your students understand the following:

	no	to some extent	very we
acid rain	1	2	3
global address	1	2	3
the difference between an hypothesis and a guess	1	2	3
how winds affect acid rain	1	2	3
how acid rain affects the environment	1	2	3
what scientists do	1	2	3
why science data are important	1	2	3

27. How many of your students could:

	few	some	most	all
find the ph of a liquid	1	2	3	4
find patterns in science data	1	2	3	4
use graphs to evaluate data	1	2	3	4
evaluate predictions	1	2	3	4

Appendix III

Student Surveys & Test and Data

Student Survey
Pre Project

Your class is involved in a special research project to find out whether or nc the Kids Network is a good instructional program for classes like yours. Students in about 25 Iowa schools are participating in this study. Both you and your teacher are being asked to provide information now and when you have completed the program. A report will be written about this project so that others schools can decide if they want to use the Kids Network. The report will describe all the classes and will not mention individual students.

The purpose of this survey is to find out a little bit about you before your class starts the program. This will help us to figure out what students learn when they participate in the Kids Network. You should be as honest as possibl as you answer the questions. There may be words or ideas that you don't understand and that is perfectly all right. You will not be graded on your answers. Please remember that this is an evaluation of the Kids Network and NOT an evaluation of you.

Thank you for helping us with this important study!

Class number: _____
Student number: _____
Sex: M F
Age: _____
Grade: _____

1. What do you want your career to be when you grow up?

_____

2. Have you done each of the following things on a computer?

	yes	no
School Work		
Museum activities		
Video or Arcade games		
Educational games or programs		
Word Processing (like Bank Street Writer, Magic Slate, Appleworks)		
Paint or Draw Programs (like MacPaint, Deluxe Paint, Turtle Graphics)		

Data Base
(like PFS File, MECC Dataquest,
Appleworks)

Spreadsheet
(like MicroSoft Works, Appleworks)

Typing/Keyboarding programs
(like Mastertype, Communikeys,
Typing Tutor)

Electronic mail
(like FRed Mail, Quick Mail)

Programming
(like Basic, Logo, Pascal)

3. How do you (or would you) feel about working with computers?

___ enjoy a lot
___ OK
___ don't like

4. Whether or not you have used a computer, do you think computers are:

___ easy to use
___ somewhat difficult to use
___ very difficult to use

5. About how often did you use a computer at school last year?

___ every day
___ a few times a week
___ once a week
___ once every few weeks
___ only a few times ever
___ never

6. Have you ever taken a computer class?

___ yes
___ no

7. Have you ever taken a typing or keyboarding class?

___ yes
___ no

8. How do you feel about studying science?

___ excited
___ OK
___ unhappy
___ don't know

9. How do you feel about sending letters and information to students in oth schools?

___ excited
___ OK
___ unhappy
___ don't know

10. How do you feel about working in teams with other students?

___ excited
___ OK
___ unhappy
___ don't know

11. How much do you know about using maps?

___ nothing at all
___ a little
___ a good amount
___ a great deal

12. How much do you know about how scientists do research?

___ nothing at all
___ a little
___ a good amount
___ a great deal

13. How much do you know about using graphs?

___ nothing at all
___ a little
___ a good amount
___ a great deal

14. How much do you know about finding a global address?

___ nothing at all
___ a little
___ a good amount
___ a great deal

15. How much do you know about doing science experiments?

___ nothing at all
___ a little
___ a good amount
___ a great deal

16. How much do you know about acids, bases, and the pH scale?

___ nothing at all
___ a little
___ a good amount
___ a great deal

17. How much do you know about acid rain?

___ nothing at all
___ a little
___ a good amount
___ a great deal

18. How much do you know about making and checking predictions and hypothesis

___ nothing at all
___ a little
___ a good amount
___ a great deal

19. How much do you know about finding patterns in science information?

___ nothing at all
___ a little
___ a good amount
___ a great deal

20. How much do you know about how winds affect acid rain?

___ nothing at all
___ a little
___ a good amount
___ a great deal

21. How much do you know about how acid rain affects the environment?

___ nothing at all
___ a little
___ a good amount
___ a great deal

Student Survey
Post Project

This survey will help us to learn how you felt about the Kids Network project and what you learned by participating in it. Your teacher is also being aske to provide this type of information. A report will be written about the project so that other schools can decide if they want to use the Kids Network The report will describe all the classes in the project and will not mention individual students.

It is important for you to be as honest as possible as you complete the surve so that we can really tell what students think about the Kids Network program and what they learn from it. You will not be graded on your answers. Please remember this is an evaluation of the Kids Network and **NOT** you.

Thank you for helping us with this research!

Class number: _____
Student number: _____
Sex: M F
Age: _____
Grade: _____

1. What do you want your career to be when you grow up?

   _____

2. How do you feel about working with computers?

   ___ enjoy a lot
   ___ OK
   ___ don't like

3. Do you think computers are:

   ___ easy to use
   ___ somewhat difficult to use
   ___ very difficult to use

4. Do you think that you had enough chances to use the computer as part of the Kids Network project?

   ___ yes
   ___ no

5. How often did you use the computer as part of the Kids Network project?

   ___ every day
   ___ a few times a week
   ___ once a week

___ once every few weeks
___ only a few times ever
___ never

6. How do you feel about studying science:

___ enjoy a lot
___ OK
___ don't like

7. How do you feel about using the computer to send letters and information to students in other schools?

___ enjoy a lot
___ OK
___ don't like

8. How do you feel about doing your science work with small groups of students?

___ enjoy a lot
___ OK
___ don't like

9. How do you feel about doing science research?

___ enjoy a lot
___ OK
___ don't like

10. Would you like to do more Kids Network units?

___ yes
___ maybe
___ no

11. How much did you learn about using maps from the Kids Network units?

___ nothing at all
___ a little
___ a good amount
___ a great deal

12. How much did you learn about how scientists do research?

___ nothing at all
___ a little
___ a good amount
___ a great deal

13. How much did you learn about using graphs?

___ nothing at all
___ a little
___ a good amount
___ a great deal

14. How much did you learn about finding a global address?

___ nothing at all
___ a little
___ a good amount
___ a great deal

15. How much did you learn about doing science experiments?

___ nothing at all
___ a little
___ a good amount
___ a great deal

16. How much did you learn about acids, bases, and the pH scale?

___ nothing at all
___ a little
___ a good amount
___ a great deal

17. How much did you learn about acid rain?

___ nothing at all
___ a little
___ a good amount
___ a great deal

18. How much did you learn about making and checking predictions and hypothesis?

___ nothing at all
___ a little
___ a good amount
___ a great deal

19. How much did you learn about finding patterns in science information?

___ nothing at all
___ a little
___ a good amount
___ a great deal

20. How much did you learn about how winds affect acid rain?

___ nothing at all
___ a little
___ a good amount
___ a great deal

21. How much did you learn about how acid rain affects the environment?

___ nothing at all
___ a little
___ a good amount
___ a great deal

22. Do you look forward to taking more science classes?

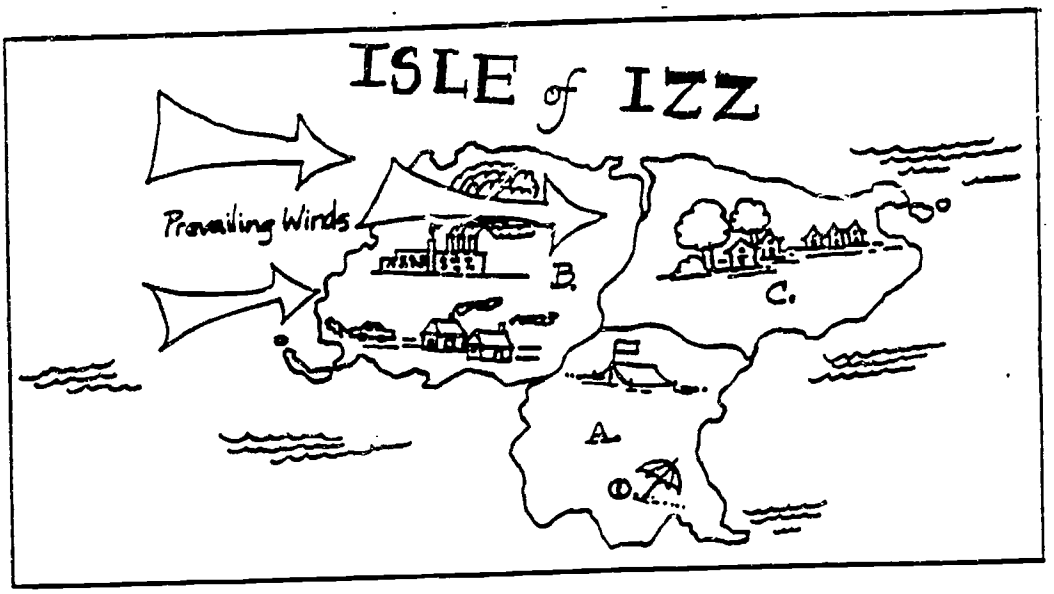
___ yes
___ maybe
___ no

23. Would you like to belong to a science club?

___ yes
___ maybe
___ no

Student Post Test

Class Number: _____



Part I: The Isle of Izz

The Isle of Izz is an imaginary island far out in the ocean, at least 1,000 miles from any other land. There are three communities on the island (The communities are labeled A, B, and C on the map above.)

Lately, the people in all three communities have been worrying about aci rain. They want to know how acidic their rainwater might be. They have aske you to make some predictions about the acidity of their rainwater. Look carefully at the map and answer the following questions:

1. Which community will have the most acidic rain?

___ a
___ b
___ c

2. Which community will have the least acidic rain?

___ a
___ b
___ c

3. What are the reasons for your answers to numbers 1 and 2?

_____

_____

Part II: Mystery Sample

The people of Izz have asked you to measure the acidity of a rain sample from one of their communities. Your teacher will give you the sample. You will also need narrow-range pH paper and a pH chart.

1. What is the pH of the sample? ____

2. What was the pH of most of the rain samples your class collected? _____

3. Is the sample more or less acidic than most of the rain samples you collected? _____

4. What might happen to a shell if you put it in the sample and left it for several days?

_____

Appendix III Results of the Teacher and Student Surveys

This appendix reports the results from the three teacher surveys and the two student surveys in Appendix I.[1]

Teachers
1. Pre-Project Survey; Alpha = .88
2. Post-Inservice Survey; Alpha = .69
3. Post-Project Survey; Alpha = .60

Students
1. Pre-Project Survey; Alpha = .56
2. Post-Project Survey; Alpha = .55

Teachers were assigned a class number and students were assigned a student number by their teacher. Teachers were tracked by their social security and class numbers and students by their class and student numbers. Teachers were asked to inform the evaluators of any student numbers that were added or deleted during the course of the study as a result of new or moving students.

Of the 56 project teachers, 49 were included in the analyses of the pre- and post-project teacher surveys. The students of the 49 teachers were included in the analyses of the pre- and post-project student surveys (pre-survey = 1823; post-survey n = 1694).[2] Seven teachers and their students were not included for the following reasons:

1. Two teachers did not return their teacher and student post-project surveys in time to be included.
2. Two teachers switched to a later Acid Rain unit, one completed too late to include their teacher and student post-project surveys.
3. Two teachers switched students from the Hello unit to the Acid Rain unit. Thus, different students completed the pre- and post-project student surveys.
4. One teacher did not return the teacher post-project survey.

Two more teachers were dropped from the analyses of the inservice survey and among the post-inservice survey and the pre- and post-project surveys. They were dropped because neither completed the post-inservice survey. One teacher had not been identified at the time of the inservice and hence did not participate. The other participated but did not complete the survey.

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[1]Results are not reported for the student test because of low reliability, an Alpha of .29. The low reliability may have either or both of two sources: the instrument itself or variability in how teachers (and, in many cases, students) carried out the scoring procedure.

[2]The difference in the number of students completing the pre- and post-project student surveys suggests that student identification and tracking procedures were not entirely successful.

In addition to looking at the teachers and the students in the aggregate, the following groups were compared:

Teachers

1. Two Units in Fall v. One Unit in Fall and One Unit in Spring
2. Low KN Index v. High KN Index

   A Kids Network Index was based on teachers' responses to the 12 items in pre-survey question 14 on their expertise with aspects of the project's instructional approach. Responses were summed and teachers at or below the median score were compared to those above the median.[3]

3. Teaching Experience -- 0-4 years v. 5-10 years v. 11-16 years v. 17+ years
4. Classroom Organization -- Self-Contained v. Departmental
5. Grade -- 4th v. 5th v. 6th v. 2-Grade v. Other[4]

Students

1. Two Units in Fall v. One Unit in Fall and One Unit in Spring
2. Grade -- 4th v. 5th v. 6th[5]

The three other comparisons were not made for students because the teacher comparisons on the post-inservice and post-project surveys indicated little difference among the teachers compared.

Within-survey comparisons are either independent samples t-tests, Pearson correlations, or ANOVAs followed up, when significant by Student-Newman-Keuls procedures. The between-survey teacher comparisons -- pre-project/post-inservice and post-inservice/post-project -- are either paired-samples t-tests or Pearson correlations.

For each of the five surveys, descriptive statistics on all items are reported first. (n's are reported only on items for which the number of

---

[3]A technology index also was calculated by summing responses to questions 1 and 2 on the pre-project survey. However, the index did not discriminate between the upper and lower halves. Therefore, the results of these analyses are not reported.

[4]The 2-Grade category includes those teachers who indicated they taught two of grades 4, 5, and 6 on the pre-project survey. The Other category includes teachers who indicated they taught more than two grades, a subject area, or a population (e.g., Talented and Gifted [TAG]).

[5]Almost all students who completed surveys indicated that they were fourth, fifth, and sixth graders (pre-project -- 1807 of 1823; post project -- 1678 of 1694).

respondents is fewer than the number of respondents completing the survey -- pre- and post-project teacher surveys, n=49; post-inservice teacher survey, n=47; and pre- and post-project student surveys, respectively, n= 1623 and n=1694.) Then statistically significant within-survey comparisons are reported.

Results for the three teacher surveys are followed by results of the between-survey teacher comparisons. Results for the two student surveys complete the appendix.

Pre-Project Teacher Survey

Sex	Male	9	Teaching Experience	0-4 yrs	10
	Female	40		5-10 yrs	11
				11-16 yrs	11
				17+ yrs	17
Education	Bachelors	11	Grade	Third	1
	Bachelors + 15	13		Fourth	11
	Bachelors + 30	15		Fifth	14
	Masters	5		Sixth	5
	Masters + 15	3		Two-Grade	
	Masters + 30	2		Other	

		n	Mean	Std Dev
	(1 never used <-> 4 experienced)			
1.	Indicate your level of use/expertise with the following hardware			
	a. Apple IIGS		2.24	.99
	b. Other Computer 1	39	2.95	.86
	c. Other Computer 2	12	2.92	.90
	d. Mouse		1.96	1.12
	e. Modem		1.20	.58
2.	Indicate your level of use/expertise with the following types of software			
	a. Word processing		2.20	.95
	b. Spreadsheet	48	1.79	.97
	c. Data base		1.84	.92
	e. Communications		1.26	.605
	f. Instructional software		2.40	.75
	g. Computer games		2.90	.71

		#	Freq
3.	How many computers did you have in your classroom on a full-time basis prior to the Kids Net Project?	0	15
		1	28
		2	5
		30	1
4.	How many computers did you have in your classroom on a part-time basis prior to the Kids Network Project?	0	26
		1	17
		2	3
5.	How many times per week did your students go to a computer lab?	0	20
		1	14
		2	7
		3	5
		4	1

6.	How much time did a typical student spend on the computer during a typical week last year?	> 1 hr	19
		30 min-1 hr	17
		< 30 min	6
7.	How often did you, the teacher, use the computer during a typical week last year?	daily	2
		sev times/wk	15
		< 1/wk	17
		not at all	9
8.	Indicate the subject areas for which your students used the computer (check all that apply):	Math	34
		Science	24
		Geo/Soc St	28
		Reading/LA	32
		Other	11
9.	Indicate the ways in which your students used the computer (check all that apply):	Drill and practice	38
		Problem solving	31
		Word processing	27
		Communications (using modem)	0
		Graphics	9
		Games	36
		Simulations	23
		Graphing	5
10.	Indicate the ways in which you, the teacher used the computer (check all that apply):	Word processing	34
		Record keeping	20
		Spread sheet	7
		Data Base	11
		Communications (using modem)	1
		Other	7
11.	Do you have a computer in your home?	Yes	24
		No	24
12.	How long have you had a home computer?	< 1 yr	2
		1-2 yrs	5
		> 2 yrs	18
13.	How often do you use your computer?	daily	4
		sev times/wk	14
		< 1/wk	7

		n	Mean	Std Dev
	(1 minimal <-> 3 considerable)			
14.	Please indicate your level of teaching expertise with the following content, skills, and strategies:			
	a. acid rain	48	1.46	.54
	b. acids/bases/pH scale	48	1.40	.61
	c. map skills	48	2.29	.65
	d. graphing skills	48	2.33	.59
	e. finding patterns in science data	48	1.62	.73
	f. scientific research methods	47	1.70	.78
	g. predictions/hypotheses	48	1.96	.82
	h. letter writing		2.45	.61
	i. computer skills		1.92	.79
	j. critical thinking	47	2.28	.65
	k. cooperative learning	47	2.30	.69
	l. hands-on science	47	2.12	.76
	(1 none at all <-> 4 thorough understanding)			
15.	Before you arrived today how much information did you have about the goals and objectives of the KN units?		1.80	.54
16.	Before you arrived today how much information did you have about how computers and technology will be used in the Kids Network units?		1.71	.54
	(1 not at all <-> 4 well prepared)			
17.	How well prepared are you to teach your students how to use the computer and technology in the Kids Network program?		1.94	.75
18.	How well prepared are you to teach your students the information and skills presented in the Kids Network units?		1.98	.90
19.	How well prepared are you to teach the procedures for collecting, analyzing, and sharing data?		2.20	.82
20.	How well prepared are you to coordinate the various components of the Kids Network units?		1.84	.87

		n	Mean	Std Dev
	(1 not at all <-> 4 very much)			
21.	To what extent do you think the Kids Network units will help you to reach your students' learning goals in areas other than science?		3.53	.62
22.	Are you responsible for teaching the students who will be using the Kids Network units a science curriculum beyond what is covered in the Kinds Network Units?		Yes No	8 41

Statistically Significant Comparisons:

Two Units in Fall v. One Unit in Fall and One Unit in Spring (F v. FS)

			Mean	t-value	Sig
5.	How many times per week did your students go to a computer lab?	F FS	1.38 .52	2.86	.006
17.	How well prepared are you to teach your students to use the computers and technology...	F FS	2.22 1.59	3.21	.002
18.	How well prepared are you to teach the information and skills...	F FS	2.22 1.68	2.17	.035
20.	How well prepared are you to coordinate the various components...	F FS	2.15 1.45	2.98	.005

		r	Sig	Comparison
8.	Subject areas in which students use computers.			
	a. math	4.14	.04	F 81.5% v FS 54.5%
	b. science	4.70	.03	F 70.4% v FS 40.9%
	c. geography/social studies	4.30	.04	F 70.4% v FS 40.9%
9.h	Indicate if your students use computers for graphing.	4.54	.03	F 18.5% v FS 0%
10.d	Indicate if you use computers for data base.	4.09	.04	F 33.3% v FS 9.1%

Low KN Index v. High KN Index (L v. H)

			Mean	t-value	Sig
1.b	Indicate your level of use/ expertise with other computers.	L H	2.67 3.28	-2.35	.02
2.b	Indicate you level of use/ expertise with spread sheet.	L H	1.54 2.19	-2.04	.05
2.c	Indicate your level of use/ expertise with data base.	L H	1.59 2.14	-2.13	.04
2.d	Indicate your level of use/ expertise with communications.	L H	1.07 1.50	-2.59	.01
2.e	Indicate your level of use/ expertise with inst. software.	L H	2.74 3.18	-2.13	.04
4.	How many computers did you have in your classroom part-time?	L H	.33 .74	-2.26	.03
6.	How much time per week did a student spend using a computer?	L H	1.50 1.94	-2.07	.04
12.	How long have you had a computer?	L H	2.38 2.92	-2.25	.03

Please indicate your level of teaching expertise with...
(Question 14 responses were the basis for the KN index)

14.a	acid rain	L H	1.92 1.77	-4.32	.00
14.b	acids/bases/pH scale	L H	1.15 1.68	-3.29	.00
14.c	map skills	L H	1.96 2.68	-4.55	.00
14.d	graphing skills	L H	1.96 2.77	-6.39	.00
14.e	finding patterns in science data	L H	1.15 2.18	-6.76	.00
14.f	scientific research methods	L H	1.20 2.27	-6.50	.00

			Mean	t-value	Sig
14.g	prediction/hypothesis	L H	1.46 2.54	-6.00	.00
14.h	letter writing	L H	1.70 2.18	-2.20	.03
14.i	critical thinking	L H	1.92 2.68	-4.92	.00
14.j	cooperative learning	L H	2.04 2.59	-2.96	.00
14.k	hands-on science	L H	1.80 2.45	-3.24	.00
	Before you arrived today, how much information did you have about...				
15.	the goals and objectives of the KN units	L H	1.59 2.04	-3.19	.00
16.	how computers and technology will be used in the KN units	L H	1.56 1.91	-2.39	.02
19.	How well prepared are you to teach the procedures for collecting, analyzing, and sharing data?	L H	1.96 2.50	-2.40	.02

		r	Sig	Comparison
10.d	Indicate whether you, the teacher, used data base	4.44	.035	H 36.4% v L 11.1%

Teaching Experience -- 0-4 Years v. 5-10 Years v. 11-16 Years v. 17+ Years

			Mean	F p Sig (<.05) group diff's
1.c	Indicate your level of use/expertise with a third computer	0-4 5-10 11-16 17+	2.00 4.00 3.00 2.25	F(3,8) = 5.59 p = .02 5-10 > 17+
14.j	Indicate your level of teaching expertise with critical thinking	0-4 5-10 11-16 17+	1.78 2.60 2.36 2.29	F(3,43) = 3.02 p = .04 5-10, 17+ > 0-4

Classroom Organization -- Self-Contained v. Departmental (SC v. D)

			Mean	t-value	Sig
Indicate your level of teaching experience with...					
14.e	finding patterns in science data	SC	1.43	-2.21	.03
		D	1.89		
14.f	scientific research methods	SC	1.46	-2.45	.02
		D	2.00		
14.g	predictions/hypotheses	SC	1.75	-2.15	.04
		D	2.26		
18.	How well prepared are you to coordinate the various components...	SC	1.79	-2.02	.05
		D	2.30		

		r	Sig	Comparison
22.	Are you responsible for teaching students using KN units a science curriculum beyond KN?	8.30	.00	D 35.0% v SC 3.6%

Grade -- 4th v. 5th v. 6th v. 2-Grade (2G) v. Other

			Mean	F p Sig (<.05) group diff's
Indicate your level of teaching experience with...				
14.e	finding patterns in science data	4th	1.27	F(4,42) = 8.79
		5th	1.36	p = .00
		6th	1.20	
		2G	2.00	2G > 4th, 5th
		Other	2.67	Other > 4th, 5th, 6th, 2G
14.f	scientific research methods	4th	1.20	F(4,41) = 8.18
		5th	1.43	p = .00
		6th	1.40	
		2G	2.18	2G > 4th, 5th
		Other	2.67	Other > 4th, 5th, 6th
14.g	predictions/hypotheses	4th	1.73	F(4,42) = 4.21
		5th	1.71	p = .01
		6th	1.40	
		2G	2.64	2G > 4th, 5th, 6th
		Other	2.33	

		Mean	F p Sig (<.05) group diff's
15.	Before you arrive today, how much information did you have about KN goals and objectives	4th 1.64 5th 1.64 6th 1.40 2G 2.09 Other 2.14	F(4,43) = 3.20 p = .02 2g > 5th

		Mean	Std Dev
	(1 not at all <-> 4 thorough understanding)		
1.	How well do you understand the goals and objectives of the Kids Network units?	3.51	.55
2.	How well do you understand the role of computers and technology in the Kids Network units?	3.62	.57
	(not important 1 <-> very important 3)		
3.	Rate the importance of the following goals of the Kids Network:		
	a. Students explore real and engaging scientific problems	2.98	.15
	b. Students understand that science is a cooperative venture	2.91	.28
	c. Students participate in inquiry-oriented, hands-on science	2.98	.15
	d. Students develop science process skills	2.91	.28
	e. Students use the computer to record receive, and share information	2.83	.38
	f. Students activities are interdisciplinary	2.77	.43
	g. Students learn mapping skills	2.79	.41
	h. Students lean about communities different from their own	2.91	.28
	(1 not at all <-> 4 well prepared)		
4.	How well prepared are you to teach your students to use the computer and technology in the Kids Network program?	3.51	.55
5.	How well prepared are you to teach your students the information and skills presented in the Kids Network units?	3.40	.54
6.	How well prepared are you to teach the procedures for collecting and sharing data?	3.45	.54
7.	How well prepared are you to coordinate the various components of the Kids Network units?	3.28	.58

		Mean	Std Dev
	(1 not at all <-> 4 very much)		
8.	To what extent do you think the Kids Network units will help you to reach your students' learning goals in areas other than science?	3.83	.43

		Freq.
9.	Do you plan to use the Kids Network as:	
	- special science activities unrelated to your regular science program	3
	- a supplement to your regular science program	9
	- an integral part of your regular science program	28
	- a replacement for your regular science program	7

		Mean	Std Dev
10.	How many days per week do you plan on using the Kids Network activities? (1 day <-> 5 days)	3.48	1.13

Statistically Significant Comparisons:

Two Units in Fall v. One Unit in Fall and One Unit in Spring (F v. FS)

No significant differences

Low KN Index v. High KN Index (L v. H)

		Mean	t-value	Sig
1.	How well do you understand the goals and objectives of the Kids Network units?	L 3.36 H 3.68	-2.09	.04

Teaching Experience -- 0-4 Years v. 5-10 Years v. 11-16 Years v. 17+ Years

No significant differences

Classroom Organization -- Self-Contained v. Departmental (SC v. D)

9. Do you plan to use the Kids Network as...

r	Sig
9.95	.02

	Unrelated	Supplement	Integral	Replacement
SC		14.8%	59.3%	25.9%
D	15.8%	26.3%	57.9%	

Grade -- 4th v. 5th v. 6th v. 2-Grade (2G) v. Other

10. How many days per week do you plan on using the Kids Network activities?

	Means	F p Sig (<.05) group diff's
4	3.50	F(4,38) = 2.77
5	3.73	p = .04
6	3.60	Other < 4, 5, 2-grade
2G	3.82	
Other	2.17	

		n	Mean	Std Dev
	(1 not at all <-> 4 thorough understanding)			
1.	How well do you understand the goals and objectives of the Kids Network units?		3.71	.50
2.	How well do you understand the role of computers and technology in the Kids Network units?	48	3.67	.56
	(1 not important <-> 3 very important)			
3.	Rate the importance of the following goals of the Kids Network:			
	a. Students explore real & engaging scientific problems		2.98	.14
	b. Students understand that science is a cooperative venture		2.90	.31
	c. Students participate in inquiry-oriented, hands-on science		2.94	.24
	d. Students develop science process skills		2.82	.39
	e. Students use the computer to record receive, and share information		2.76	.43
	f. Students activities are interdisciplinary		2.78	.42
	g. Students learn mapping skills about communities different from their own		2.82	.39
	(1 low <-> 4 high)			
4.	Please rate your ability with the following elements of the Kids Network units:			
	a. Computer/technology		3.24	.56
	b. Coordination of components; e.g., data collection management strategies instructional strategies, computers		3.18	.60
	c. Data collection		3.43	.68

		n	Mean	Std Dev
	(1 not important <-> 4 very important)			
5.	Please rate the contribution of the following components to the success of the Kids Network units:			
	a. Telecommunicating		3.73	.49
	b. Computer software		3.86	.35
	c. Student research		3.75	.43
	d. Research teams (classes in other schools)		3.67	.55
	e. Inservice training		3.69	.55
	f. Teachers manual		3.82	.39
	g. Student worksheets		3.35	.60
	h. Student activities		3.75	.48
	i. Extension activities		3.02	.56
	j. Interdisciplinary approach		3.49	.54
	k. Cooperative learning		3.69	.47
	l. Critical thinking		3.80	.41
	m. Unit scientist		3.04	.61
	n. Kids Network hotline	48	3.77	.42
	o. Unit topics		3.55	.54
	p. Hello unit (intro)	46	3.48	.66

			Freq
6.	While using the Kids Network units did you get technical support from	the other project teacher	41
		other staff at my school	11
		district technical specialist	3
		regional technical specialist (AEA)	1
		Kids Network hotline	40
		other	1
7.	If you received technical assistance, who provided the most useful support?	the other project teacher	23
		other staff at my school	2
		district technical specialist	0
		regional technical specialist (AEA)	0
		Kids Network hotline	23

		n	Mean	Std Dev
	(1 not at all <-> 4 very much)			
8.	To what extent did the Kids Network units help you to reach your learning goals for your students in science?		3.53	.54
9.	To what extent did the Kids Network units help you to reach your learning goals for your students in areas other than science?		3.29	.68

		Freq
10.	How did you use the Kids Network units?	
	- As special science activities un related to your regular science program	8
	- As a supplement to your regular science program	9
	- As an integral part of regular science program	14
	- As a replacement for regular science program	18

		n	Mean	Std Dev
11.	How many days per week did you use the Kids Network unit activities? (1 day <-> 5 days)		3.69	1.2

		Used	Did not
12.	Indicate which of the extension activities you used with your class:		
	Hello Extensions		
	a. Sending extra letters to teammates	22	27
	b. Exchanging objects with teammates	12	35
	c. Making pen pals with research teammates	16	33
	d. Making a graphing bulletin board	39	10
	e. Graphing pet data from the research team	48	1
	f. Exchanging letters with teammates on surprising pet data	13	36
	g. Collecting additional pet data	15	34
	h. Discussing possible biases	35	14
	i. Making a mapping bulletin board	40	9
	Acid Rain Extensions		
	j. Sending extra letters to teammates	18	31
	k. Testing pH of different brands of the same liquid(s)	28	21
	l. Making your own pH paper	10	39
	m. Making a poster size pH scale	14	35
	n. Charting pH of local rainfall	41	8
	o. Testing pH at beginning and end of the same rainfall	21	28

		Used	Did not
	p. Comparing pH of rainfall collected from different places	47	2
	q. Tracking the movement of rain storms	10	39
	r. Recording students families' use of cars	35	14
	s. Tabulating data on car use	27	22

		Yes	Maybe	No
13.	Would you use the Kids Network units again?	46	2	1

		Freq
14.	If you use the Kids Network units again would your prefer to use	
	- only one unit during the entire year	10
	- two units during one semester	4
	- only one unit per semester	34

		Yes	Maybe	No
15.	Would you consider teaching some of your other science units using the Kids Network approach?	42	7	
16.	Would you recommend the Kids Network units to a colleague?	46	2	

		Freq
17.	Please check all that apply	
	a. Other teachers have asked me about the Kids Network project	43
	b. Other teachers have observed my class while we were using the Kids Network units	19
	c. I have demonstrated the software to other teachers	35
	d. I have demonstrated telecommunicating to other teachers	34
	e. I have shared materials from the project with other teachers in my building	30
	f. I have shared information about the project with teachers from other buildings in the district	24
	g. I have shared information about the project with teachers outside of my district	34

18.	Did you teach any other science units during the last 4 months?			Yes 32 No 17
		n	Mean	Std Dev
19.	If yes, how many days per week did you teach non-Kids Network science curriculum? (1 day <-> 5 days)	30	2.90	1.49
	(1 high <-> 3 minimal)			
20.	How would you rate the level of support of your principal in this project?		1.24	.48
	(1 all <-> 5 none)			
21.	How many of the telecommunications deadlines were you able to meet?		1.37	.57
22.	How many of the telecommunications deadlines did the other members of your Kids Network research team meet?		2.47	.79
23.	On average, how many times per unit did most students get to use the computer?			None 2 1 5 2-4 29 5-7 11 8 or more 2
		n	Mean	Std Dev
	(1 all <-> 5 none)			
24.	How many of the unit activities were appropriate for students with special learning needs?		2.16	.69
25.	If you were to use the Kids Network with a new class, would you start with the Hello Unit?			Yes 37 No 5 Maybe 7

		n	Mean	Std Dev
	(1 no <-> 3 very well)			
26.	Do the majority of your students understand the following:			
	a. acid rain		2.71	.46
	b. global address		2.73	.45
	c. the difference between an hypothesis and a guess		2.18	.44
	d. how winds affect acid rain	48	2.50	.50
	e. how acid rain affects the environment		2.82	.39
	f. what scientists do		2.24	.43
	g. why science data are important		2.43	.50
	(1 few <-> 4 all)			
27.	How many of your students could:			
	a. find the pH of a liquid	48	3.60	.57
	b. find patterns in science data	48	2.71	.54
	c. use graphs to evaluate data	48	3.10	.51
	d. evaluate predictions	48	2.79	.62

Statistically Significant Comparisons

Two Units in Fall v. One Unit in Fall and One Unit in Spring (F v. FS)

		r	Sig	Comparison
18.	Did you teach any other science units during the last 4 months?	7.81	.00	F 48.1% v. FS 86.4%

		Mean	t-value	Sig
5.1	Please rate the contribution of critical thinking to the success of the Kids Network units.	F 3.92 FS 3.64	2.62	.01
19.	How many days per week did you teach non-Kids Network science curriculum?	F 1.92 FS 3.65	-3.78	.00
20.	How would you rate the level of support of your principal in this project.	F 2.59 FS 2.95	-2.81	.01

Low KN Index v. High KN Index (L v. H)

		r	Sig	Comparison
12.m	Indicate which of the extension activities you used - making a poster size pH scale.	4.36	.04	L 40.7% v. H 13.6%
17.b	Other teachers have observed my class while we were using the Kids Network units.	4.18	.04	L 25.9% v. H 54.5%

Teaching Experience -- 0-4 Years v. 5-10 Years v. 11-16 Years v. 17+ Years

		r	Sig	Comparison	Other Project Teacher	Other Staff at School	Hotline
7.	If you received technical assistance, who provided the most useful support?	14.44	.02				
	1-4				50		50
	5-10				16.7		83.3
	11-16				45.5		54.5
	17+				70.6	11.8	17.6

		r	Sig	Yes
12.d	Did you use a graphing bulletin board?	11.99	.01	
	1-4			37.5
	5-10			100.0
	11-16			83.3
	17+			82.4

		r	Sig	Yes
12.i	Did you make a mapping bulletin board?	9.15	.03	
	1-4			50
	5-10			91.7
	11-16			100.0
	17+			76.5

			χ	Sig
			Comparison	
14.	If you used the Kids Network units again, would you prefer to:		16.76	.01
			1/Yr	2/Sem	1/Sem
		1-4	12.5	37.5	50.0
		5-10			100.0
		11-16	25.0		75.0
		17+	35.3	5.9	58.8
25.	If you were to use the Kids Network with a new class, would you start with the Hello unit?		14.31	.03	
			Yes	Maybe	No
		1-4	50		50
		5-10	91.7	8.3	
		11-16	66.7	25.0	8.3
		17+	82.4	5.9	11.8

			Mean	F p Sig (<.05) group diff's
5.e	Rate the contribution of inservice training to the success of the Kids Network units.	1- 4	3.75	F(3,45) = 3.35
		5-10	3.67	p = .03
		11-16	3.33	
		17+	3.941	17+ > 11-16
5.p	Rate the contribution of the Hello unit to the success of the Kids Network units.	1-4	2.87	F(3,42) = 4.17
		5-10	3.75	p = .01
		11-16	3.36	
		17+	3.67	5-10, 17+ > 1-4
19.	How many days per week did you teach non-Kids Network science curriculum?	1-4	2.83	F(3,26) = 3.09
		5-10	2.86	p = .04
		11-16	4.00	
		17+	2.90	11-16 > 17+
21.	How many of the telecommunications deadlines were you able to meet?	1-4	4.500	F(3,45) 4.46
		5-10	4.250	p = .01
		11-16	4.67	
		17+	4.94	17+ > 5-10

Classroom Organization -- Self-Contained v. Departmental (SC v. D)

		r	Sig	Comparison
17.a	Other teachers have asked me about the Kids Network Project.	4.90	.03	SC 96.4% v. D 75.0%

		Mean	t-value	Sig
5.g	Please rate the contribution of student worksheets to the success of the Kids Network units.	SC 3.14 D 3.60	-2.81	.01
5.i	Please rate the contribution of extension activities to the success of the Kids Network units.	SC 2.86 D 3.25	-2.51	.02

Grade -- 4th v. 5th v. 6th v. 2-Grade (2G) v. Other

		r	Sig	Comparison
7.	If you received technical assistance, who provided the most useful support?	16.76	.03	

	Other Project Teacher	Other Staff at School	Hotline
4	45.5%		54.5%
5	69.2%		30.8%
6	60.0%		40.0%
2G	27.3		72.7
Other	42.9		28.6

		r	Sig
12.h	Indicate which of the extension activities you used with your class -- discussed possible biases of the network sample.	12.73	.01

	Used
4	81.8
5	78.6
6	80.0
2G	81.8
Other	14.3

		Mean	F p Sig (<.05) group diff's
23.	On average, how many times per unit did most students get to use the computer?		
	4	3.64	F(4,43) = 3.53
	5	2.93	p =.01
	6	3.40	
	2G	3.27	4 > Other
	Other	2.43	

Comparisons between Pre-Project and Post-Inservice Teacher Surveys

Five comparisons (paired samples t-tests) were made between the Pre-Project (Pre) and Post-Inservice (In) Teacher surveys. All were statistically significant.

Pre/In		Pre Mean	In Mean	t-value	Sig
(1 not at all <-> 4 well prepared) How well prepared are you to...					
17/4	teach your students to use the computer and technology in the Kids Network Project?	1.94	3.51	-11.96	.00
18/5	teach your students the information and skills presented in the Kids Network units?	1.98	3.40	-10.83	.00
19/6	teach the procedures for collecting, analyzing, and sharing data?	2.23	3.48	-10.32	.00
20/7	coordinate the various components of the Kids Network Units?	1.85	3.28	-11.13	.00
(1 not at all <-> very much)					
21/8	To what extent do you think the Kids Network units will help you to reach your students' learning goals in areas other than science?	3.53	3.83	-3.28	.00

Comparisons between Post-Inservice and Post-Project Teacher Surveys

Nine comparisons (paired samples t-test) were made between the Post-Inservice (In) and Post-Project (Post) Teacher surveys. One was significant.

In/Post		In Mean	Post Mean	t-value	Sig
(1 not at all <-> 4 thorough understanding) How well do you understand...					
1/1	the goals and objectives of the Kids Network units?	3.51	3.70	-1.77	
2/2	the role of computers and technology in the Kids Network units?	3.63	3.65	-.20	
(1 not important <-> 3 very important) Rate the importance of the following goals of the Kids Network for your students:					
3a/3a	Students explore real and engaging scientific problems.	2.98	2.98	.00	
3b/3b	Students understand that science is a cooperative venture.	2.91	2.89	.33	
3c/3c	Students participate in inquiry-oriented, hands-on science.	2.98	2.94	1.00	
3d/3d	Students develop science process skills.	2.91	2.80	1.70	
3e/3e	Students use the computer to record, display, receive, and share information.	2.83	2.77	.72	
3f/3f	Student activities are interdisciplinary.	2.77	2.77	.00	
(1 not at all <-> 4 very much)					
8/9	To what extent (do you think/did) the Kids Network units will help you to reach students' learning goals in areas other than science?	3.83	3.30	4.54	.00
(1 day <-> 5 days)					
10/11	How many days per week (do you plan to/did you) use the Kids Network activities?	3.49	3.70	-1.04	

Sex			Age			Grade		
	Male	939		6 yrs	2		3rd	11
	Female	884		8 yrs	26		4th	594
				9 yrs	443		5th	823
				10 yrs	748		6th	386
				11 yrs	493		8th	1
				12 yrs	86		9th	1
				missing	25		10th	1
							11th	1
							missing	1

2. Have you done each of the following things on a computer?

	Yes	No
a. School Work	890	906
b. Museum activities	283	1514
c. Video or Arcade games	1591	214
d. Educational games or programs	1577	221
e. Word Processing (like Bank Street Writer, Magic Slate, Appleworks)	1061	739
f. Paint or Draw Programs (like MacPaint, Deluxe Paint, Turtle Graphics)	887	921
g. Data Base (like PFS File, MECC Dataquest, Appleworks)	4	1309
h. Spreadsheet (like MicroSoft Works, Appleworks)	343	1451
i. Typing/Keyboarding programs (like Mastertype, Communikeys, Typing Tutor)	1496	707
j. Electronic mail (like FRed Mail, Quick Mail)	112	1682
k. Programming (like Basic, Logo, Pascal)	548	1234

	n	Mean	Std Dev
3. How do you (or would you) feel about working with computers?	1785	1.33	.52
enjoy a lot	1236		
OK	541		
don't like	38		

		n	Mean	Std Dev
4.	Whether or not you have used a computer, do you think computers are:	1821	1.48	.53
	easy to use	987		
	somewhat difficult to use	817		
	very difficult to use	26		
5.	About how often did you use a computer at school last year?	1821	3.03	1.34
	every day	113		
	a few times a week	725		
	once a week	411		
	once every few weeks	242		
	only a few times ever	226		
	never	104		

		Yes	No
6.	Have you ever taken a computer class?	635	1179
7.	Have you ever taken a typing or keyboarding class?	786	1030

		Excited	OK	Unhappy	Don't Know
8.	How do you feel about studying science?	563	958	80	214
9.	How do you feel about sending letters and information to students in other schools?	871	653	59	238
10.	How do you feel about working in teams with other students?	763	869	55	134

		n	Mean	Std Dev
	(1 nothing at all <-> 4 a great deal)			
11.	How much do you know about using maps?	1820	2.76	.71
12.	How much do you know about how scientists do research?	1816	1.98	.76
13.	How much do you know about using graphs?	1818	2.96	.84

		n	Mean	Std Dev
14.	How much do you know about finding a global address?	1811	1.65	.86
15.	How much do you know about doing science experiments?	1821	2.70	.86
16.	How much do you know about acids, bases, and the pH scale?	1820	1.57	.75
17.	How much do you know about acid rain?	1820	1.94	.87
18.	How much do you know about making and checking predictions and hypothesis?	1818	1.54	.76
19.	How much do you know about finding patterns in science information?	1816	1.85	.80
20.	How much do you know about how winds affect acid rain?	1816	1.45	.72
21.	How much do you know about how acid rain affects the environment?	1818	1.99	.98

Statistically Significant Comparisons

Two Units in Fall v. One Unit in Fall and One Unit in Spring (F v. FS)

		r	Sig	Comparison
2.	Have you done each of the following things on a computer?			
	a. School Work	13.86	.00	F 52.7% v. FS 43.4%
	b. Museum activities	6.48	.01	F 17.3% v. FS 12.7%
	e. Word Processing	11.04	.00	F 61.7% v. FS 53.5%
	f. Paint or Draw Programs	50.21	.00	F 43.1% v. FS 60.7%
	g. Data Base	25.49	.00	F 30.0% v. FS 19.8%
	h. Spreadsheet	5.78	.02	F 20.7% v. FS 16.0%
	j. Electronic mail	5.37	.02	F 5.3% v. FS 8.1%
	k. Programming	52.15	.00	F 25.1% v. FS 41.8%
6.	Have you ever taken a computer class?	5.20	.02	F 33.2% v. FS 38.5%

			Mean	t-value	Sig
5.	About how often did you use a computer at school last year?	F FS	2.90 3.27	-5.63	.00
11.	How much do you know about using maps?	F FS	2.71 2.86	-4.13	.00
19.	How much do you know about finding patterns in science information?	F FS	1.83 1.93	-2.65	.01

Grade -- 4th v. 5th v. 6th

		r	Sig	4th	%'s 5th	6th
2.	Have you done each of the following things on a computer?					
	a. School Work	15.89	.00	44.4	54.6	46.5
	b. Museum activities	8.54	.01	18.1	13.0	17.9
	c. Video or arcade games	12.18	.00	84.5	89.7	90.9
	d. Educational games or programs	22.86	.00	82.8	89.2	92.4
	e. Word Processing	20.71	.00	54.0	65.0	54.9
	f. Paint or Draw Programs	10.49	.00	45.2	53.2	46.1
	g. Data Base	12.44	.00	22.4	30.9	27.5
	h. Spreadsheet	7.68	.02	16.0	21.9	18.7
	k. Electronic mail	46.15	.00	20.8	37.8	31.7
6.	Have you ever taken a computer class?	63.47	.00	28.0	44.8	25.2
7.	Have you ever taken a typing or keyboarding class?	11.56	.00	38.7	44.1	49.6
8.	How do you feel about studying science?	49.54	.00			
			Excited	33.3	33.8	22.1
			OK	45.8	53.6	60.9
			Unhappy	4.1	3.5	7.0
			Don't Know	16.8	9.1	9.9
9.	How do you feel about sending letters and information to	16.60	.01			
			Excited	42.7	51.1	48.7
			OK	37.4	33.9	37.6
			Unhappy	3.5	2.7	3.9
			Don't Know	16.4	12.3	9.8

		Mean	F p Sig (<.05) group diff's
3.	How do you (or would you) feel about working with computers?	4th 1.28 5th 1.36 6th 1.39	F(2,1796) = 5.98 p = .00 4th < 5th, 6th
4.	Whether or not you have used a computer, do you think computers are...	4th 1.42 5th 1.48 6th 1.54	F(2,1802) = 5.67 p = .00 4th < 5th, 6th
11.	How much do you know about using maps?	4th 2.65 5th 2.82 6th 2.82	F(2,1801) = 10.97 p = .00 4th < 5th, 6th
12.	How much do you know about how scientists do research?	4th 1.88 5th 2.04 6th 2.06	F(2,1798) = 5.38 p = .00 4th < 5th, 6th
14.	How much do you know about finding a global address?	4th 1.58 5th 1.72 6th 1.66	F(2,1792) = 5.024 p = .00 4th < 5th
15.	How much do you know about doing science experiments?	4th 2.68 5th 2.77 6th 2.64	F(2,1802) = 3.47 p = .03 6th < 5th
16.	How much do you know about acids, bases, and the pH scale?	4th 1.63 5th 1.57 6th 1.50	F(2,1801) = 3.34 p = .03 6th < 4th
18.	How much do you know about making and checking predictions and hypotheses?	4th 1.41 5th 1.56 6th 1.70	F(2,1799) = 18.13 p = .00 4th < 5th, 6th 5th < 6th
19.	How much do you know about finding patterns in science information?	4th 1.91 5th 1.89 6th 1.73	F(2,1797) = 6.97 p = .00 6th < 4th, 5th

		Mean		F p Sig (<.05) group diff's
20.	How much do you know about how winds affect acid rain?	4th 5th 6th	1.54 1.44 1.37	F(2,1797) = 7.74 p = .00 6th < 4th 5th < 4th

Sex	Male	826	Age	8 yrs	2	Grade	3rd 9
	Female	861		9 yrs	237		4th 526
				10 yrs	577		5th 769
				11 yrs	635		6th 383
				12 yrs	220		
				13 yrs	10		

		n	Mean	Std Dev
2.	How do you feel about working with computers?	1693	1.34	.52
	enjoy a lot	1149		
	OK	508		
	don't like	36		
3.	Do you think computers are:	1693	1.40	.51
	easy to use	1043		
	somewhat difficult to use	628		
	very difficult to use	22		
4.	Do you think that you had enough chances to use the computer as part of the Kids Network project?	Yes	868	
		No	822	

		n	Mean	Std Dev
5.	How often did you use the computer as part of the Kids Network project?	1686	3.68	1.34
	every day	18		
	a few times a week	484		
	once a week	215		
	once every few weeks	382		
	only a few times ever	479		
	never	108		

(1 enjoy a lot <-> 3 don't like)

6.	How do you feel about studying science?	1684	1.67	.62
7.	How do you feel about using the computer to send letters and information to students in other schools?	1693	1.41	.56
8.	How do you feel about doing your science work with small groups of students?	1689	1.53	.62

		n	Mean	Std Dev
9.	How do you feel about doing science research?	1689	1.70	.65
10.	Would you like to do more Kids Network units?	Yes Maybe No	1033 527 129	

		n	Mean	Std Dev
	(1 nothing at all <-> 4 a great deal)			
11.	How much did you learn about using maps from the Kids Network units?	1689	2.89	.75
12.	How much did you learn about how scientists do research?	1682	2.66	.77
13.	How much did you learn about using graphs?	1682	2.98	.85
14.	How much did you learn about finding a global address?	1682	3.03	.88
15.	How much did you learn about doing science experiments?	1682	3.14	.81
16.	How much did you learn about acids, bases, and the pH scale?	1682	3.26	.82
17.	How much did you learn about acid rain?	1683	3.34	.81
18.	How much did you learn about making and checking predictions and hypothesis?	1682	2.61	.86
19.	How much did you learn about finding patterns in science information?	1682	2.41	.85
20.	How much did you learn about how winds affect acid rain?	1682	2.86	.94
21.	How much did you learn about how acid rain affects the environment?	1684	3.39	.82

		Yes	Maybe	No
22.	Do you look forward to taking more science classes?	825	690	169
23.	Would you like to belong to a science club?	560	680	442

Statistically Significant Comparisons

Two Units in Fall v. One Unit in Fall and One Unit in Spring (F v. FS)

		r	Sig		F%	FS%
10.	Would you like to do more Kids Network units?	11.10	.00	Yes	58.7	66.1
				Maybe	32.5	28.5
				No	8.8	5.3

			Mean	t-value	Sig
6.	How do you feel about studying science?	F	1.64	-3.09	.00
		FS	1.73		
8.	How do you feel about doing science work with small groups of students?	F	1.56	2.90	.00
		FS	1.47		
9.	How do you feel about doing science research?	F	1.66	-3.37	.00
		FS	1.77		
13.	How much did you learn about using graphs?	F	3.02	2.61	.01
		FS	2.91		
16.	How much did you learn about acids, bases, and the pH scale?	F	3.21	-3.11	.00
		FS	3.34		
17.	How much did you learn about acid rain?	F	3.29	-2.97	.00
		FS	3.42		
20.	How much did you learn about how winds affect acid rain?	F	2.83	-1.97	.05
		FS	2.92		
21.	How much did you learn about how acid rain affects the environment?	F	3.35	-2.81	.00
		FS	3.47		

Grade -- 4th v. 5th v. 6th

		r	Sig		%'s 4th	%'s 5th	%'s 6th
4.	Do you think that you had enough chances to use the computer as part of the Kids Network project?	24.28	.00		49.7	54.4	46.5
10.	Would you like to do more Kids Network units?	21.30	.00	Yes	67.4	61.1	52.4
				Maybe	26.3	30.9	38.7
				No	6.3	8.1	8.9
22.	Do you look forward to taking more science classes?	24.28	.00	Yes	56.9	48.4	40.7
				Maybe	35.1	40.8	10.9
				No	8.0	10.9	11.3

			Mean	F p Sig (<.05) group diff's
13.	How much did you learn about using graphs?	4th	3.23	F(2, 1663) = 22.85
		5th	2.90	p = .00
		6th	2.82	
				6th < 4th
				5th < 4th
15.	How much did you learn about doing science experiments?	4th	3.37	F(2,1663) = 33.02
		5th	3.05	p = .00
		6th	3.00	
				6th < 4th
				5th < 4th
17.	How much did you learn about acid rain?	4th	3.51	F(2,1664) = 18.97
		5th	3.27	p = .00
		6th	3.22	
				6th < 4th
				5th < 4th
18.	How much did you learn about making and checking predictions and hypotheses?	4th	2.78	F(2,1663) = 21.06
		5th	2.58	p = .00
		6th	2.41	
				6th < 4th, 5th
				5th < 4th
19.	How much did you learn about finding patterns in science information?	4th	2.63	F(2,1663) = 31.18
		5th	2.35	p = .00
		6th	2.21	
				6th < 4th, 5th
				5th < 4th

		Mean	F p Sig (<.05) group diff's
20.	How much did you learn about how winds affect acid rain?	4th 3.04 5th 2.82 6th 2.68	F(2,1663) = 17.82 p = .00 6th < 4th, 5th 5th < 4th
21.	How much did you learn about how acid rain affects the environment?	4th 3.57 5th 3.30 6th 3.34	F(2,1665) = 17.84 p = .00 5th < 4th 6th < 4th

Appendix IV Site Visit Protocols and Hotline Form

Student Interview

Class number: _____
Grade: _____
Date: _____

1. How would you describe Kids Network to a student from another class or school?
   Probes: Would you recommend it to someone else?
   How would you rate it on a 1-10 (10=positive)

2. What have you learned by doing the Kids Network units?
   Probe: What have you enjoyed most about the Kids Network units?

3. What has been the most difficult part of doing the Kids Network units?
   Probes: What have you liked the least about the Kids Network units
   What would make Kids Network more enjoyable?

If the technology portions of KN does not come up in previous questions ask:

4. What did you learn from using the computers and telecommunicating?
   Probe: How did you feel about using the computers and telecommunicating?

Teacher Interview Preproject

Social Security Number: - - - - - -
(last 6 digits only)
Sex: M F
Total Years Teaching Experience: _____
Highest Level of Education: B B+15 B+30 M M+15 M+30 D
Area of Degree: _____
School: _____
Grades/Subjects: _____
Class Size: _____
Computers in classroom: _____

1. What is your usual approach to teaching science?
   Probes:
   - dependence on text books
   - how often taught
   - exactly what students do

2. Why do you use this approach?
   (e.g. mandated, tradition, resources, learned this way)

3. What do students learn from this approach? How do you know?
   (anticipate getting information about values and attitudes)

4. How do yo feel about teaching science?
   (anticipate getting information about fears, anxieties, comfort with content knowledge)

5. How would you characterize the teaching approach that will be used in th Kids Network units?
   Probes:
   - how similar to usua` approach
   - how different from usual approach

6. How will it be for you to use this approach?

7. What is your opinion about how effective the Kids Network approach will be?
   (effective=what students learn, whether students like science, whether students seek more science)

8. Why did you decide to participate in this project?

9. What are your biggest concerns about the project?

10. What interest have other teachers and administrators shown in this project?
    Probe:
    - level of support

Teacher Interview Post Project

Social Security Number: - - - - - -
(last 6 digits only)
Sex: M F
Total Years Teaching Experience: _____
Highest Level of Education B B+15 B+30 M M+15 M+30 D
Area of Degree _____
School: _____
Grade/Subject: _____

1. What is your opinion about the effectiveness of the NGS units for studen learning?

2. What is your opinion about the effectiveness of the Kids Network units f student motivation?

3. Comparing your usual approach to science and the approach used in the NG units what similarities and differences were there with respect to the following areas and WHY?:

4. Were you able to coordinate all components of the program in a way that was satisfactory to you?

5. Did you attempt to integrate the units with other science units and othe disciplines?

6. Would you be interested in using these or other Kids Network units again Why or why not?

7. Will the experience of using the NGS units have an impact in the future your teaching of science?

8. Pretend that I am your teaching colleague and I have asked you whether I should try the NGS units. Briefly, give me your most straight forward response and explanation.

9. How did you assess your students' performance on the unit activities? W this adequate?

10. How have you or what plans do you have for sharing this experience with other people in your building, district, or beyond?

11. On reflection, how well did the August inservice prepare you? What was most useful? What could have been added?

Principal Interview

School: _____

Sex: M F

Years as a Building Principal _____

1. What is your opinion about the effectiveness of Kids Network units for student learning?
   Probes:
   - describe specific positive outcomes
   - describe specific negative outcomes
   - teachers' reactions to the units

2. What is your opinion about the effectiveness of the Kids Network units student motivation?
   Probes:
   - describe specific positive outcomes
   - describe specific negative outcomes
   - teachers' reactions to the units

3. What is the basis for your opinion about the program, e.g. classroom observation, teacher, student, or parent comments.

4. Would you be interested in having your teachers use these or other Kids Network units again? Why or why not?

5. Will the experience of using the Kids Network units have an impact on t future of teaching of science in your school?

6. Will the experience of using the Kids Network units have an impact on t future use of technology in your school?

7. How have you or what plans do you and your teachers have for sharing th experience with other people in your building, district, or beyond?
   Probe:
   - Would you recommend it to other principals/teachers?

8. How well prepared did you think your teachers were to use the Kids Net units as a result of their inservice training?

HOTLINE FORM

Date: Monday, April 8, 1991

Unit#:

Product:

Team:

Mailbox:

Customer Name:

School:

Address1:

Address2:

City:

State:

Zip:

Country:

Phone:

Network Phone:

Version:

Modem Model:

Videodisc Player:

Problem:

Resolution:

Call Taken By:

Referred To:

Materials Sent:

Method:

Keyword One:

Computer Equipment

Curriculum

Modem Equipment

Public Relations

MCB

Software

Telecommunications

Misc.