

**BILL NYE Family Fun Calendar of Science
1999 Evaluation**

Submitted to KCTS and The BILL NYE Team by

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Executive Summary

During fall 1998, KCTS produced 50,000 “Bill Nye Family Fun Science Packets” that included a family calendar and a ten-minute video. This outreach packet was meant for distribution to families with school-age children and designed to encourage family science activities at home.

KCTS distributed these Packets in sets of 25-1,000 to community organizations, PBS stations, and member agencies of the Association of Science-Technology Centers (ASTC). This study focused on capturing information about family and child involvement in science activities before and after they receive the BILL NYE Family Fun Science Packet and characterizing the use patterns and impact of the Packet.

Evaluation Activities

Partner Organization Telephone Interviews Beginning in November 1998, we contacted 204 of KCTS’s partner organizations for interviews about their distribution of BILL NYE Family Packets.

Questionnaires We sent “before” questionnaires to 38 of the 204 sites for distribution at a parent meeting or event. The parents completed the form prior to receiving the calendar and video.

Approximately two months later, this same group of parents from the 23 sites received a follow-up questionnaire in the mail asking them about their use of the BILL NYE Family Packet to date. We sent the second survey to all those who completed the first survey and had included a legible, complete address—846 participating families.

Focus Groups After completing telephone interviews with parent-outreach coordinators, we selected six organizations in five cities which were willing to help us conduct focus groups. The five cities included: Seattle, Boston, New York, Dayton and Chicago.

Packet Distribution

Organizations received their Family Fun Packets between September 1998 and January 1999. Coordinators noted that with few exceptions, they distributed the packets between September 1998 and August 1999, the peak being between November and February.

More than one-third of the outreach coordinators revealed that they distributed the Packets without prior announcement; their clients came to the site “for other purposes.” Almost half of the coordinators interviewed reported doing nothing to publicize the Packets; they gave out the Packets unsolicited to regular clients.

Although there were exceptions, a typical distribution involved an encouraging pat on the back and handing the packet out to a parent with a brief, verbal explanation. About one-third of the groups played the video during the introduction of the materials or included it

as an aspect of the event itself. *up* In about half of the locations, coordinators said they followed up with their clients after the original Packet distribution.

Packet Use

The expectations of the coordinators were quite high. Two-thirds of the outreach coordinators believed their client families would use the kits once families took them home.

The Video. Use of the video, one of the most popular components of the Packet was very high, with the great majority of respondents viewing at least once. To date, 95% of the families have viewed the video.

The Calendar. Most of the families did one or more experiments from the calendar. More than a third of those receiving the packet, however, did not conduct any experiments by the time our data were collected.

Parents who participated in the project through community centers conducted more experiments, in general, and all of the experiments were tried by anywhere from 7% to 35% of the participants. The experiments modeled by Bill Nye in the video and those for January and February were the most popular. Parents rated each of the experiments that they conducted on average between “good,” and “very good.”

Baseline

Child-initiated family discussions about nature, astronomy and animals are significantly more likely to occur within families who received the packets via science centers, and these parents also report a greater frequency of questions in general from their children.

We also asked a series of questions in an attempt to profile family interactions, especially as they relate to science activities.

We also asked questions about adults experience with science and about science activities instigated by parents. Parents who received the packets at science centers are significantly more likely to engage in science activities themselves than are those who received the packets at community centers.

On average, parents agreed slightly that two impediments to conducting science experiments at home are lack of time and the messiness of science

Those parents with reservations about the video or BILL NYE tended to be more experienced with science in school and in their careers. Those with the most glowing comments often claimed to have disliked science as students and to not be “science people.”

Effect of the Packets

After using the packets, not unpredictably, children more frequently “suggest science activities.” The opportunity to view the video and attempt a few experiments seemed to stimulate more interest in science. Also, our high users find that they agree

significantly less with the statement, "I don't know where to get answers," to children's questions about science. Parents seem to now have a greater sense of available resources and strategies for finding answers to their children's questions. They may also realize that they don't have to know all the answers to their child's questions about science. Among both high-user families (three or more experiments) and low-user families, parents agreed significantly more often with the statement, "Science is messy" after using the Packet.

Highlights of Conclusions and Recommendations

- ◆ Packets were distributed informally and at non-structured events. Overall, one-third of the packets were given out during family and children's programs or daily interactions such as an after-school program.
- ◆ Most people who received the kits used them in some way.
- ◆ Materials needed for experiments were easily located.
- ◆ Families conducted a moderate amount of experiments. By the end of the study period, more than two-thirds of the responding families had conducted BILL NYE experiments at home. Each experiment was tried by anywhere from 5% to 40% of the group.
- ◆ The BILL NYE name encouraged people to try the Packet.
- ◆ The video was a nearly universal outreach tool. Parents offered copious accolades for the video, and the video experiments were the most popular ones, both of these across ethnic and socio-economic lines.
- ◆ Packets were well received. Parents cited both student enjoyment and learning as outcomes from both the video and the calendar.
- ◆ The video moved people from enjoying passive, TV entertainment to active, science experimenting.
- ◆ Time constraints and mess discourage science at home. After using the Packets, parents who tried three or more experiments were significantly more cognizant of how time consuming and potentially messy science can be.
- ◆ The Packets reached many families who had only a modest interest in science because of their educational experiences.
- ◆ Clarify who the intended audience of the Packet is. There is ambiguity about the audience's age level and the level of the parents' science experience, and some wonder, "Are the Packet and its contents for parents or children?"

- ◆ Use established distribution strategies and partners to reach target populations and maximize use of outreach gifts. The current distribution strategy reached a very diverse group of people, socio-economically, ethnically, and in terms of family size, make-up and experience with science.
- ◆ Consider producing materials in other languages.
- ◆ Provide more opportunities to receive official BILL NYE experiments. Many parents who became excited about family science as a result of their experiences with the video and calendar expressed a desire to find more BILL NYE activities.
- ◆ Provide more cautionary messages, especially for parents to join kids in doing experiments.

BILL NYE Family Fun Calendar of Science 1999 Evaluation

Background and Methodology

During fall 1998, KCTS produced 50,000 “Bill Nye Family Fun Science Packets” that included a family calendar and a ten-minute video. This outreach packet was meant for distribution to families with school-age children and designed to encourage family science activities at home. The calendar can be hung on a wall or stand by itself, and on each of the twelve monthly pages, there is a science investigation or experiment that uses common household supplies. On the back of each monthly investigation page are a brief explanation and background information about the phenomenon illustrated through the experiment. The video, hosted by Bill Nye, shows him speaking to a diverse group of parents, attempting to allay their concerns and reservations about doing science with their children; it concludes with him conducting two, almost “fool-proof” experiments.

KCTS distributed these Packets in sets of 25-1,000 to community organizations, PBS stations, and member agencies of the Association of Science-Technology Centers (ASTC). To receive the packets, KCTS required that organizations work directly with parent groups through their regular outreach activities.

ROCKMAN *ET AL*, an independent research firm specializing in the evaluation of educational technology projects, undertook a study of the BILL NYE Family Fun Science Packet, both print and video materials, during fall 1998 and spring 1999. This research effort explored reactions to the BILL NYE outreach materials among families and the family outreach coordinators who distributed the Packets. This study focused on capturing information about family and child involvement in science activities before and after they receive the BILL NYE Family Fun Science Packet and characterizing the use patterns and impact of the Packet.

Working with BILL NYE’s partner organizations, researchers gathered initial information from participating families about their attitudes toward and experience with science. Several months after distribution of the BILL NYE Family Fun Science Packet, researchers looked again at family science activities and attitudes, seeking to identify the influence of the outreach materials on the participants. The evaluation looked at how families engage in a variety of science activities

Participants

Among the 408 organizations that received sets of the BILL NYE Family Fun Science Packet, researchers selected 204 agencies across the country for telephone interviews; we talked with site-level administrators or family outreach coordinators at each selected site. We chose the sites for balance among geographic location, demographics and the types of partner. The BILL NYE outreach activities included 48 PBS stations, 52 ASTC affiliates or other science and math centers and 104 community resource centers, such as Girls Inc., Boys and Girls Clubs, YMCA, school sites, home-school groups and Urban League locations. We made a special attempt to include a diverse group of sites, both in terms of socioeconomic characteristics and racial/ethnic attributes by working with a variety of organizations, each of which used different strategies to reach parents and families.

Additionally, we used control groups of five parent groups from the list of organizations provided by KCTS which meet to provide parent education, but that had not received the BILL NYE family calendar and video.

Data Collection Activities

Partner Organization Telephone Interviews Beginning in November 1998, we contacted 204 of KCTS's partner organizations for interviews about their distribution of BILL NYE Family Packets. The researchers asked about their plans for workshops and regularly scheduled parent activities—especially science activities. The researchers gathered background information about the level of family interest in different outreach programs, the nature of the organizations' interaction with parents, strategies for outreach, and the ages of the children participating in the agencies' activities.

We questioned parent-outreach coordinators about their expectations for the use of the packets and asked about their plans for workshops and, where some distribution had already occurred, sought to learn how and where packets were distributed and how much instruction each organization provided at that time. We also asked coordinators to compare BILL NYE materials to other outreach materials and to reflect on best practices in providing teaching resources to organizations like theirs.

The BILL NYE outreach managers provided the evaluators with a list of 406 organizations that received the packets. To capture the organizations' impressions before and after distributing the packets, for our interviews we selected only organizations that we believed had not yet distributed all of their packets. By the time our interviews began in November, 60 of those called had given out all of their outreach materials, another 43 organizations never returned phone calls and 27 interviews were begun but not completed, mostly because the contact person did not have sufficient information to fully respond. In sum, evaluators contacted all but 72 of the distributing organizations. The evaluators were able to interview 204 site-level coordinators who arranged the distribution activities and conducted those interviews before the packets were completely

distributed. That group was comprised of 52 PBS stations, 104 community centers and 48 science centers or museums.

Two months after distribution of the calendars and videos, we conducted brief, follow-up interviews with all family outreach coordinators at BILL NYE partner agencies who had spoken with us previously. We had a 66% success rate in the second round of interviews. Most of the remaining 34% of coordinators had not completed their distribution of Packets by the time we conducted second interviews; the others were either unable or unwilling to provide additional information or did not return phone calls. We interviewed them about their distribution of the Family Packets in light of the plan they discussed in the earlier interview. We collected information about the numbers of participants, family reactions, and any additional plans for the packets.

Questionnaires We sent “before” questionnaires to 38 of the 204 sites for distribution at a parent meeting or event. The parents completed the form prior to receiving the calendar and video. The questionnaires were designed to develop a profile of the participating families prior to their use of the outreach materials. We asked parents to rate their experience and comfort level with science and how they talk about science with their children. Parents also reflected on their family’s viewing of the BILL NYE series and other science shows, participation in science activities in the home, visits to science centers and museums, as well as descriptive demographic information.

In an effort to understand how families are able to create a science focus within a family setting, we included questions about who initiates science inquiry in the family and what motivates them. We also asked how much time is available after cooking, homework, and chores are done, and sought to identify the fears or barriers families have about doing science. We requested names and addresses of all parents who received the calendar and video so that we could contact them again after they had an opportunity to use the Packet at home for a while.

From the 38 sites to which we had sent family questionnaires for distribution, we received 899 completed surveys from 23 of them, including: 608 responses from 9 science centers or centers, 43 responses from three PBS stations, and 198 from 11 community centers. Fifty of the returned surveys did not identify their distributing agent and arrived individually through the mail. The remainder of the organizations to whom we sent surveys were unable to return surveys either because their outreach event did not allow enough time for families to complete the form, collecting the forms was too difficult, or their planned event was delayed until after the research period. To build the numbers of survey participants, evaluators visited science centers in three cities (Chicago, New York, and San Francisco) to pass out “before” questionnaires to families entering or leaving the science center and, in exchange, provided them with BILL NYE Family Fun Science Packets to take home.

Approximately two months later, this same group of parents from the 23 sites received a follow-up questionnaire in the mail asking them about their use of the BILL NYE Family Packet to date. We sent the second survey to all those who completed the first survey and

had included a legible, complete address—846 participating families. As incentive, a two-dollar bill was taped within the folded, postage-paid self-mailer. More than 19 percent, or a total of 163 second surveys were returned by June 1999, including 116 from science centers or museums, 37 community resource centers and 9 from PBS stations. The participants from PBS stations formed a small and anomalous group as they were primarily made up of child-care providers rather than parents. Consequently, their data were left out of most statistical analyses. Once again, evaluators built up the community center participation in the second survey by calling participants to encourage them to return the second survey or by taking their responses over the telephone.

This second questionnaire asked about which experiments families conducted, how satisfied they were with these science activities and whether they used the calendar. Also, we asked if doing experiments provoked interest in other science activities, what children and parents learned from participating, as well as questions that get at the nature of the family time spent conducting the experiments. Furthermore, the questionnaire included many of the same questions that this group answered before receiving the Family Packet.

Both the pre- and post-participation questionnaires were translated into Spanish prior to administering them at selected sites, upon request.

Focus Groups After completing telephone interviews with parent-outreach coordinators, we selected six organizations in five cities which were willing to help us conduct focus groups. The five cities included: Seattle, Boston, New York, Dayton and Chicago. The agencies were diverse: two parent groups at school organizations, one Urban League chapter, one science museum, a parenting class, and a PBS station. Each group had a strong concentration of parents of students in grades three through five.

Partner organizations publicized the opportunity to participate in a focus group to their regular clients and organized the focus groups. We were seeking 8-10 parent participants for each group. To participate, parents had to agree to viewing the video tape, reviewing the entire calendar and trying two particular experiments – different ones for each focus group. In a room provided by each partner organization, an evaluator led 60-to-90-minute focus groups about how families responded to the Family Packet. The focus groups permitted more detailed exploration of the contents and influence of the video and print guide as well as deeper questioning of parent attitudes toward science. Each participant received a modest honorarium for participating, and the organization received a BILL NYE, the Science Guy video for their library.

What we found

Distributing Agencies

KCTS chose to distribute the BILL NYE Family Fun Science Packet through a range of community agencies, science and technology centers, and PBS stations that regularly conduct family outreach activities. Natural variation was built into the scope of participating agencies. We interviewed roughly half of the approximately 400 organizations to whom KCTS gave packets. We found that science centers tended to reach the greatest number of people and received on average 500 packets to distribute. On average, PBS stations received 40 packets to distribute, and community centers averaged 140 (with the range from 25 to 500). Among the community organizations with whom we spoke, there were 30 Urban League chapters, four YMCA and YWCA's, 17 Girls Inc. sites and numerous school-related groups as well.

We asked the agencies involved to characterize their clients' backgrounds and demographics, the types of outreach activities each agency had sponsored for children and families before receiving the BILL NYE Family Fun Science Packet, and some background on the organization. We found that several of the recipients who received large numbers of packets, in turn, further distributed packets to subsidiary organizations. We were able to pursue the second level of distributing agents to a limited degree, when the coordinator could provide distribution plans or organizational background information.

Partner agencies' client demographics Outreach coordinators tended to characterize their client populations in very general terms. Especially at larger organizations, coordinators seemed unable to provide more than broad generalizations about their agency's clients. Socioeconomic data, ages of children, and family structure were more reliably reported by survey participants themselves on questionnaires, than by outreach coordinators. Nonetheless, we include below some of the demographic data obtained through coordinator interviews to broadly sketch the nature of the clients served by various agencies.

Ethnicity Most of the respondents did not identify their ethnic or racial background, and of those who did, the great majority were Caucasian (See Table 1, below.). Proportionately we were more likely to find minority participants at our community center sites than at science centers and museums and PBS stations.

**Table 1: Initial Parent Questionnaire:
Number of parents identifying with each ethnicity (N= 882)**

	PBS stations	Community centers	Science centers	No agency	Total
Asian American	0	3	24	1	28
Caucasian	14	38	251	5	308
African American	7	25	17	3	52
Latino	3	46	47	3	99
Latino-Spanish surveys	0	23	3	0	26
Other ethnicity/none					369

Family make-up In the interviews with agency outreach staff, we were told that there is a sizable number of single-parent families, over 60%, participating in the programs at these agencies. However, most outreach coordinators were not extremely confident in their estimates.

The first questionnaire asked parents to report the number of children in their family. 275 respondents left this question blank; however, because the form did not include “none” as a possible answer, we suspect that the question was skipped by child care providers or other staff interested in learning more about this outreach program. OR ...staff who had attended the outreach event. Most of the participants who did respond reported two or more children. More than half (56%) of the respondents indicated that they had children within the target ages of seven through eleven.

**Table 2: Initial Parent Questionnaire:
Percent responding who had each number of children (N= 332)**

1 child	2 children	3 children	4 children	5 children	6 + children
20%	45%	24%	7%	3%	2%

Agency Activities Of the agency contacts with whom we spoke, PBS stations held, on average, five science-related workshops per year, mostly associated with the Ready-to-Learn program. The average is misleading, however, since the PBS stations either conducted ten or more science workshops or did none at all. Community centers averaged four science-related workshops or events annually, but again 63 respondents of that group stated that they were offering none or one that year. Science centers averaged 57 workshops annually, and they were more evenly distributed; only three interview respondents said that they did not plan any events this year.

Interviewers asked agency contacts characterized their science-related activities. Evaluators categorized their responses and compiled the results in the table that follows.

**Table 3: Outreach coordinator interviews:
Describe agencies' science activities done with families**

	PBS Stations	Community Centers	Science Centers
Hands-on activities	15	15	23
Television shows or Ready-to-Learn	8	0	1
Bill Nye programming or material use	8	2	0
Watched a film/listened to music	0	2	0
Workshop about academic subject	2	16	10
Professional speaker/expert visit	0	4	5
Taught science to adults	1	6	3
Astronomy	1	2	4
Nature: Insects and animals/ nature walk/birding/meteorology	5	2	10
Constructed things: building/ engineering/ electricity	0	3	6
Operation SMART	0	3	0

N= 204 (52 PBS Stations, 104 Community Centers, 48 Science centers)

Much of what takes place at all categories of agencies includes hands-on activities for children and their parents, and many workshops do seem connected directly to school content areas.

Hands-on activities included: *baking soda and vinegar reactions, soda bottle and balloon chemical reactions, optical illusions, a yeast experiment, slime making, paper airplanes, volcano construction, magnetic experiments, fingerprinting (forensics), a leaf scavenger hunt, fossil hunting, making dinosaur tracks (molds), fish dissection, pig dissection, mixing "gack," dissecting owl pellets, a "workshops where they make weather happen", a robotics class, making telescopes, a crayfish survey, pill bug races, blowing bubbles, making root beer, tie-dying and web activities.*

Connections to school subjects included: *chemistry, physics, crystal structure (geology), architecture, math, nature (generally), telecommunications, relationships between organisms, earth science, anatomy, physiology and "literature and science reading."*

When these agencies hold events for parents and families, they most often use printed materials, with video as a second component. Computers are not a large part of these events, nor are outdoor activities. Table 4, below, describes how each kind of agency uses materials in its outreach events.

**Table 4: Outreach coordinator interviews:
What materials have been used at agency events?**

	PBS stations	Community centers	Science centers
Printed materials	45 (86%)	77 (74%)	32 (67%)
Video tapes or discs	41 (79%)	46 (44%)	18 (38%)
Objects to show	28 (54%)	28 (27%)	28 (58%)
Computers	7 (13%)	24 (23%)	12 (25%)
Science lab materials	12 (23%)	21 (20%)	30 (62%)
Outdoors	4 (8%)	12 (12%)	16 (33%)

N= 204 (52 PBS Stations, 104 Community Centers, 48 Science centers)

Distribution of Packets

Packet Advertisement In interviews with agency contacts, we discussed how they publicized their distribution of the Bill Nye Family Packets. More than one-third of the outreach coordinators revealed that they distributed the Packets without prior announcement; their clients came to the site “for other purposes.” Almost half of the coordinators interviewed reported doing nothing to publicize the Packets; they gave out the Packets unsolicited to regular clients. These coordinators suggested two reasons for their distribution strategy: either they wanted their clients to be surprised by the gift or they wanted control over the distribution; several said they wanted to give the Packets to families “who would use them.”

A few coordinators actively publicized the Packets. Eleven interview participants said they gave limited radio or television time to announcing the availability of the Packets or about the event where Packets were distributed. Yet a few contacts, especially PBS station contacts, balked at the notion that they might announce the Packets, afraid of a crush of inquiries far greater than the number of kits allotted them. Thirty-six respondents advertised the kits through a newsletter or regular correspondence, but none used email or the Internet for that purpose. Forty-six contacts posted flyers that mentioned the Bill Nye Packets as incentive for attending events or meetings.

Packet Distribution Organizations received their Family Fun Packets between September 1998 and January 1999. Coordinators noted that with few exceptions, they distributed the packets between September 1998 and August 1999, the peak being between November and February.

Evaluators asked coordinators about their distribution strategies. Table 5, below, illustrates the range of strategies employed by the agencies. Note that science centers and community agencies focused their distribution on family programs and after-school events, while the PBS stations distributed more to teachers and child care providers. Science centers included the packet as part of “goodie bags” distributed as an accompaniment to outreach activities, not integral to the activity, but handed out as a take-home gift.

**Table 5: Outreach coordinator interviews:
How were packets distributed?**

Question	PBS stations	Community Centers	Science Centers
As part of a family program	17 (33%)	55 (53%)	38 (79%)
As a prize for accomplishment or a drawing	17 (33%)	11 (11%)	3 (6%)
To teachers	27 (52%)	6 (6%)	14 (29%)
As part of a kids' program		33 (32%)	8 (16%)
Keeping for future use		7 (7%)	
Ready-to-Learn	9 (17%)		

N= 204 (52 PBS Stations , 104 Community Centers, 48 Science centers)

Although there were exceptions, a typical distribution involved an encouraging pat on the back and handing the packet out to a parent with a brief, verbal explanation. About one-third of the groups played the video during the introduction of the materials or included it as an aspect of the event itself.

**Table 6: Outreach coordinator interviews:
Assistance given by coordinators to families**

What assistance given when passing Packets out?	PBS stations	Community Centers	Science Centers
Description of materials (either written or spoken)	25 (46%)	66 (65%)	27 (56%)
Presentation of video	15 (28%)	28 (27%)	8 (17%)
Demonstration of materials	9 (17%)	31 (30%)	18 (38%)
Group experiments	6 (12%)	16 (15%)	9 (19%)
Nothing extra, just handed out	13 (25%)	20 (19%)	9 (19%)
Encouragement to try science at home	27 (52%)	54 (53%)	28 (58%)

N= 204 (52 PBS Stations, 104 Community Centers, 48 Science centers)

Our parent questionnaire data confirm and extend these findings. Most people who completed surveys reported having minimal contact with the agency about the Packet. If they did, it usually took the form of a short description of the materials – either orally or, less frequently, written as in a flyer. Community center and science center participants described/reported the assistance they received from agency coordinators as:

Nothing extra. They just handed them out.	32%
Short description of the materials	47%
Presentation of the video	15%
Demonstration of the experiments	6%
Together they tried experiments	3%

Follow-up In about half of the locations, coordinators said they followed up with their clients after the original Packet distribution. Follow-up most often took the form of an informal chat about how families liked and used the Packet. A few of the science centers designed more formal evaluation forms, but most follow-up, like distribution, was very casual. The coordinators' data are confirmed by the parents' reports.

**Table 7: Outreach coordinator interviews:
Number of coordinators who followed up after distributing Packets**

	PBS stations	Community Centers	Science centers
Yes	10	48	38
No	26	25	21
Sometimes	3	14	7
Don't know	12	12	5

N= 204 (52 PBS Stations, 104 Community Centers, 48 Science centers)

Use of the Bill Nye Family Fun Packet of Science

Three sources informed our pursuit of the nature and frequency of family use of the BILL NYE Family Packet: interviews with partner agency outreach coordinators, parent questionnaires and parent focus groups. The nature and value of the data from each source differed. Outreach coordinators based their responses to questions about family use of the Packets largely upon the responses of the families who received them and their idiosyncratic knowledge of their client families, knowledge that depended on their frequency of contact with their client families. Parent questionnaire data were first-hand, completed by the parents who received the Packets, but it was limited in the amount of material that could be covered in a three-page survey and, in some cases, by literacy or English language barriers. Information from parent focus groups, while not easily quantified, did guarantee exposure to the Packet, since participants were asked to try a few experiments and view the video prior to attending. Together, these strategies complement each other and provide triangulated data about Family Packet use.

The expectations of the coordinators were quite high. Two-thirds of the outreach coordinators believed their client families would use the kits once families took them home. Only three percent thought the packets would not be used at all; the remainder offered no responses. In most cases, the coordinators were optimistic, and shared the rationale for their answers. The following table summarizes these findings:

**Table 8: Outreach coordinator interviews (N=204):
Coordinators suggest why parents will/not use the Packets.***

Answers	Community centers	PBS stations	Science centers
<i>Someone will push it. encourage it?</i>			
Kids will push it./Kids excited, do it on their own.	10	2	2
Coordinators will urge/or describe sufficiently to compel	7		
<i>Some quality of the Packets</i>			
Bill Nye personality/show/expertise	7	7	6
Easy activities/ everyday materials, good for kids	9	1	11
Packet itself: Video + Calendar	12	9	11
<i>Meets a need for people who receive Packets</i>			
Pre-selection – parents already invested/involved in science stuff	22	11	8
Parents want to do things with kids, but need good ideas	11	11	7
Teachers/ childcare providers/home-schoolers will use	5	11	1
Positive parent reaction when they received it	3	4	6

*The comments were made regardless of the answers given. Some “yes” answers elicited reasons why parents will not use the packets and visa versa.

Forty-one (20%) of the site coordinators thought that people who received the Packets would use them because the recipients were a select group, either because families who brought home the Packets would already have an interest in family science and therefore would actively use them, or that in some cases, the coordinators carefully identified appropriate recipients of the Packets in order to be assured that the families who received Packets would use them.

Some of the coordinators thought that Packet use depended upon someone “pushing it,” such as a parent, teacher, the site coordinator or alternately, a child. If one of them became excited about the Packet, it would be used because that individual would convince others to participate. In some cases, the coordinator believed the students would need convincing to participate in experiments at home, while in other cases, the adults would.

Many more coordinators thought that some attribute of the Packet would compel people to use it. Coordinators thought that both the video and the calendar individually would be popular. Recognition of the BILL NYE name contributed to that popularity and came up continuously throughout the evaluation in focus groups and discussions with outreach coordinators.

In interviews and focus groups, participants indicated that children were more likely than parents to respond to BILL NYE, but that children could be instrumental in drawing their parents in. The following table captures viewing patterns among the parents.

**Table 9: Initial parent questionnaire:
Parents report how often their children watch Bill Nye (N= 808)**

Never	Once in a while	Several times a month	Several times a week	I am not sure	Other
166 (21%)	304 (38%)	143 (18%)	101 (13%)	64 (8%)	29 (25%)

Some outreach coordinators thought families would not use the Packets once they went home because of the lack of time, the difficulty of getting parents involved in their child’s activities, and that the science issues would be intimidating to parents.

Given the overall positive (and hopeful) expectations of the site coordinators, just how much were the Packets used? From the second questionnaire, administered through the mail approximately two months following receipt of the Packet, we found that 42% of the respondents spent more than one hour with the materials. However, about the same number spent less than one-half hour with the Packet contents.

**Table 10: Follow-up parent questionnaire:
Amount of time spent working with materials at home**

Amount of time spent describing materials?	Community & Science Centers Together
no time	10%
1-30 min.	34%
31-59 min.	10%
1-2 hrs.	18%
2-5 hrs.	12%
5-12 hrs.	2%
1+ days	10%
no response	4%

N= 153 (116 Community Center and 37 Science center participants)

The Video Use of the video, one of the most popular components of the Packet was very high, with the great majority of respondents viewing at least once. To date, 95% of the families have viewed the video. The data can be seen in Table 11, below.

**Table 11: Follow-up parent questionnaire:
Number of families who viewed the video**

	Community center participants	Science center participants
Once	59%	45%
More than one	35%	37%
No	5%	15%

N= 153 (116 Community center and 37 Science center participants)

Although the video was directed at parents, children were the most likely group to watch the video. Parents were also likely to watch. Parents who received the Packet at a science center were less likely to watch the video than those who had received it at a community center, although there was not much difference in whether their children watched it.

**Table 12: Follow-up parent questionnaire:
Who watched the video? ***

Assistance	Parents/ guardians	Household children	Friends of children	Extended family
All respondents	58%	75%	10%	10%
Community Centers	70%	81%	8%	11%
Science Centers	53%	72%	10%	9%

N= 153 (116 Community Center and 37 Science center participants)

* Percents in any category exceed 100% because participants could select more than one choice.

Evaluation of the Video Parents who participated in the focus groups (who were asked to watch the video prior to attending the session) were exceptionally positive about it. The following quotes are indicative of their responses:

I didn't start watching the video till 12pm last night. We were laying down—I was tired, ready to go to bed. I watched the video and I saw him do the baking powder, and I jumped up instantly and went to the kitchen. I got out that little jar, shook it up; and if I had a bottle with a candle I would have done that, too.

I'm like that last lady when she was talking about the fact that if you make a mistake, so what? I don't try to make my children think that I know everything. You know...because we're not expected to know everything...

If (my son's) interest doesn't lie there (science) I'm certainly not going force him there because of Bill Nye or some tape or what anybody else says ...

The video... it actually showed you what to do instead of you trying to read it on your own and hope that it comes out right. It actually showed you the effects and everything.

I think that age group that he was talking to was adults, but I still think he was talking down to us. I think it is for lower-working-class parents. I think it is for high school or lower graduation level... the huckster routine.

The video... we liked the shortness of it.

The video I would only view once. I would get the idea of the video and then give it to a friend. Kids might view it more than once.

It is hard to reach people who are not science-oriented. People who don't view science in a very good light... in the arts or literature world might not have all the answers either.

While most focus groups spent time discussing how to deal with the mess, where to get answers to science questions, and issues around the safety of having children do experiments, several of the focus groups noted, at least briefly, the persuasive intent of the video. Comments about BILL NYE’s persuasive approach were polar opposites: either positive, agreeing that families should spend more time doing family science, or negative, feeling that the discourse was condescending. It should be noted that these focus groups strongly suggested a relationship between parents’ level of education and socioeconomic status and their positive or negative feelings about the video. Those parents with reservations about the video or BILL NYE tended to be more experienced with science in school and in their careers. Those with the most glowing comments often claimed to have disliked science as students and to not be “science people.”

The Calendar The calendar, containing twelve experiments and explanations of the phenomena encountered in conducting each experiment, was also a frequently mentioned and popular component of the Packet. Through the parent questionnaire, we captured use patterns and impressions of the calendar, including individual ratings of each experiment.

As Table 13, below, indicates, most of the families did one or more experiments from the calendar. More than a third of those receiving the packet, however, did not conduct any experiments by the time our data were collected.

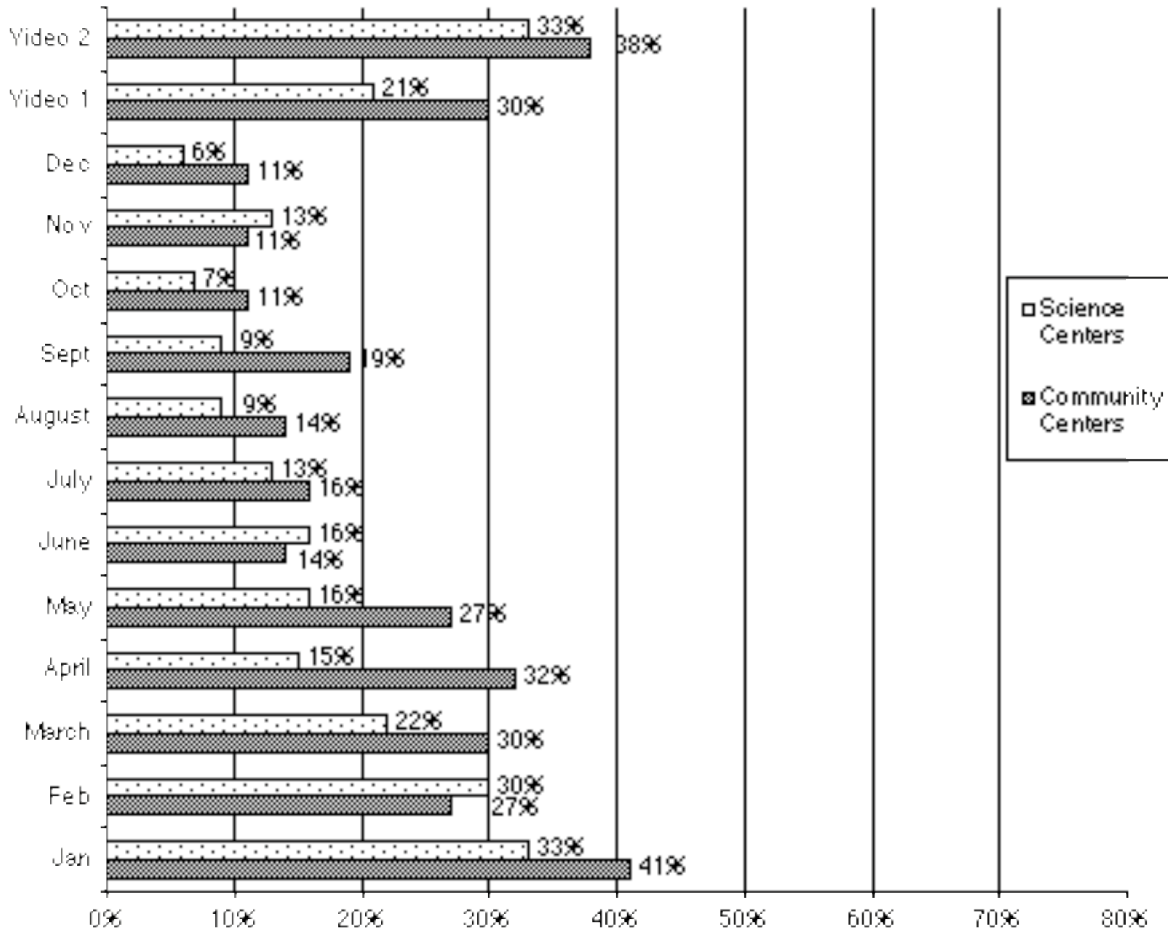
**Table 13: Follow-up parent questionnaire:
Number of families who conducted experiments**

	Community center participants	Science center participants
One	43%	38%
More than one	16%	19%
None	38%	36%

N= 153 (116 Community center and 37 Science center participants)

Those who did conduct an experiment were asked to indicate which one (or ones) they had conducted. In the figure, below, we list the experiments by the calendar month in which they were listed. The two experiments from the video are also included, since it was also available to many of the packet recipients.

**Figure 1: Follow-up parent questionnaire:
Percent of families who conducted each experiment**
N= 153 (116 Community center and 37 Science center participants)



Parents who participated in the project through community centers conducted more experiments, in general, and all of the experiments were tried by anywhere from 7% to 35% of the participants. There is a tendency to begin at the beginning of the calendar year, as suggested by the calendar format, and do the experiments in order. The experiments modeled by Bill Nye in the video were also very popular, and were conducted quite frequently, probably because they were easy to undertake after viewing.

Evaluation of the Calendar Parents rated each of the experiments that they conducted on a five-point scale where one was “very poor,” two was “poor,” three was “OK,” four was “good,” and five was “very good.” The figure that follows illustrates the average ratings of each of the experiments.

**Figure 2: Follow-up parent questionnaire:
Average ratings of each experiment by parents who conducted them
N= 153 (116 Community center and 37 Science center participants)**

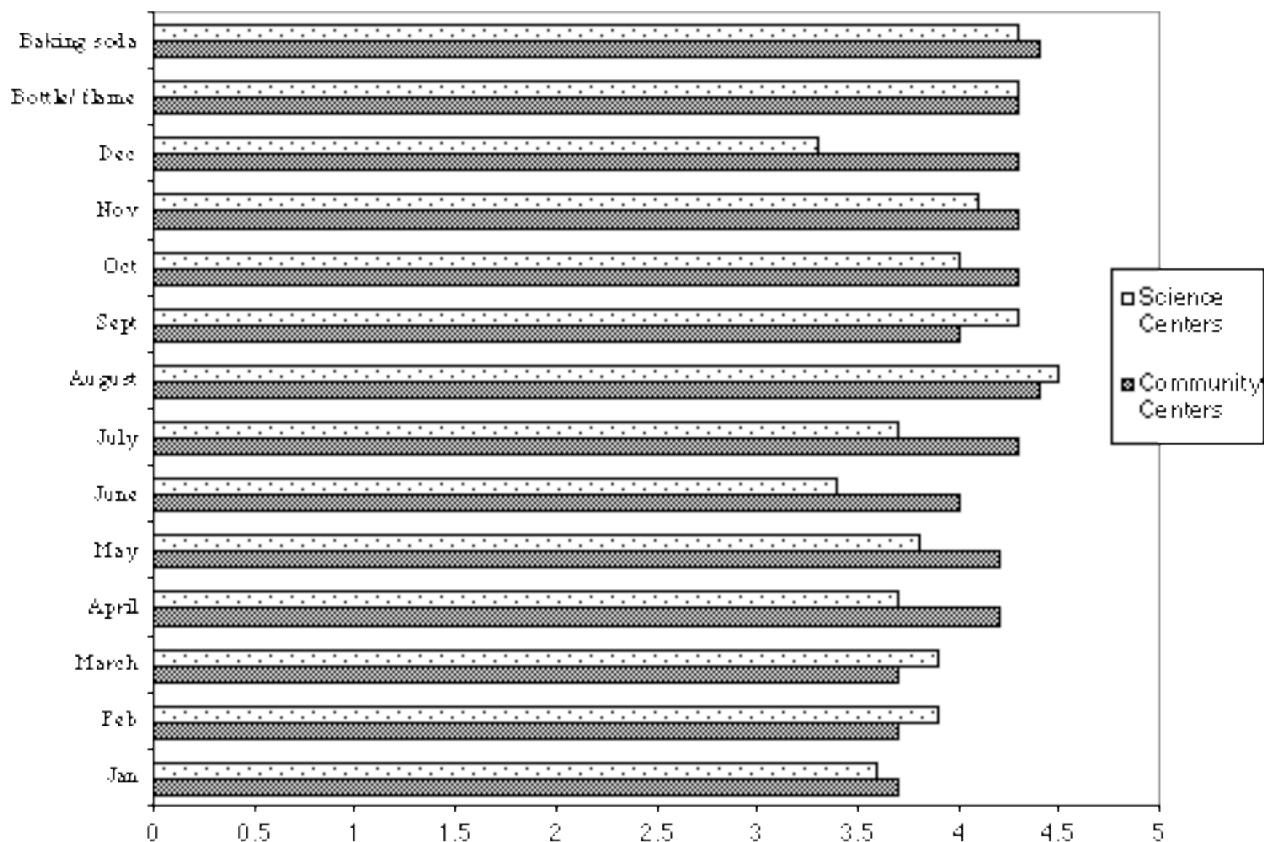


Table 13 and Figure 1 show that the experiments received only moderate use; but, those families who tried the experiments felt very positively about them. All of the experiments averaged better than three, or “ok,” and many hovered around four, or “good.” Most popular were the video experiments and August’s “Bellowing Balloon” From the focus group participants, we noted many very positive statements about the experiments they tried prior to attending the focus group session.

Science is hard to begin with in the first place, so... when the demonstrations are easy it gets the parents involved with the kids.

It brings families together because it brought us together. More than what we were because we were actually together and doing (but this was) something other than me

taking him somewhere to see something. We were actually working on something together. It was fun.

Impact of the Family Packet

Through parent questionnaires before and after distribution of the Packets and focus groups, we tried to capture the impact and value of the Family Packets on families.

Where things started

Two-thirds of participants in our follow-up questionnaire said that their children “gained an interest in science” from using the Packet, and many of the remainder supplemented their answer with comments such as “my child was already interested in science,” suggesting a ceiling effect. Further, in Table 14, below, parents rated their agreement with the statements on a scale from one to five where one is “disagree a lot,” and five indicates “agree a lot.”

**Table 14: Follow-up parent questionnaire:
Percent of parents who agree with each of the following statements**

Statement	Community center parents	Science center parents
The family packet encouraged my family to do science together.	3.7	3.7
My kids enjoyed the experiments in the calendar.	3.9	3.8
My kids learned some science from the calendar.	4.0	3.9
We displayed the calendar. It is useful.	3.4	3.4
My kids enjoyed the video.	4.2	4.1
My kids learned some science from the video.	4.1	4.0
I liked watching the video.	4.0	3.9
I had a hard time locating supplies to do the experiments.	2.2	2.5
The packet convinced me that doing science would not be hard or messy, but fun.	3.8	3.8

N= 153 (116 Community Center and 37 Science center participants)

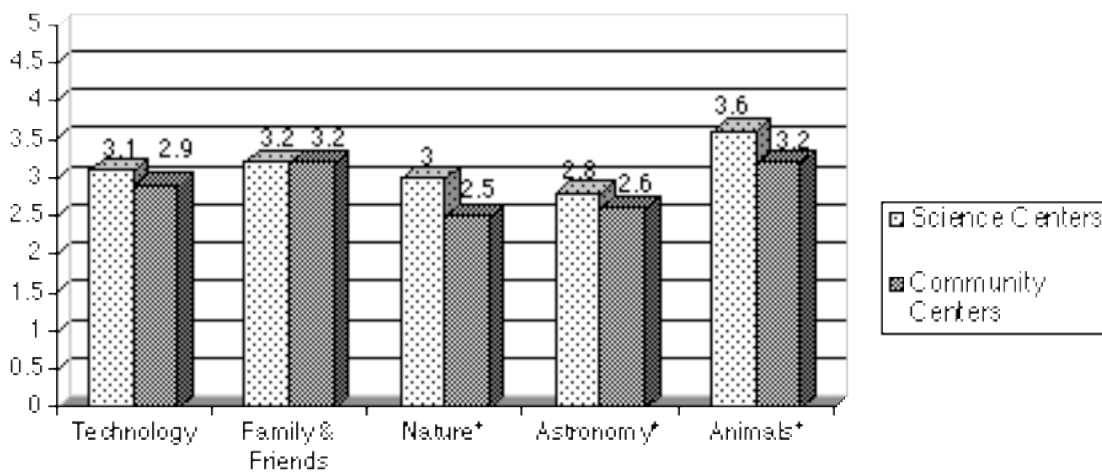
Generally, data suggest that the packets were well received. There is a positive trend in answers about parents’ impressions of the Packet. Enjoyment and learning from both the video and calendar were among the most positive answers. People were less likely to display the calendar, but found it useful and used the experiments.

Perspectives on Science To understand the effects of the packet on participants, we compared parents’ responses to questions before and after the packets were distributed and used. Answers to the first questionnaire provide a description about the baseline attitudes of the participants before using the Packets. We found that interesting differences exist between those who received the Packets through a community center

and those who received them through a science center. The following series of figures illustrate a consistent trend, suggesting that these two populations began the study with different perspectives about science.

Questions Children Ask We began by asking five questions about the types of family dialogue that take place around various topics. Parents rated the frequency that their children ask about each topic on a scale of zero to five, where zero is “never,” one is “occasionally,” two is “regularly,” three is “often,” four is “very often” and five is “almost every day.”

**Figure 3: Initial parent questionnaire:
Average frequency of children’s questions (N=882)**

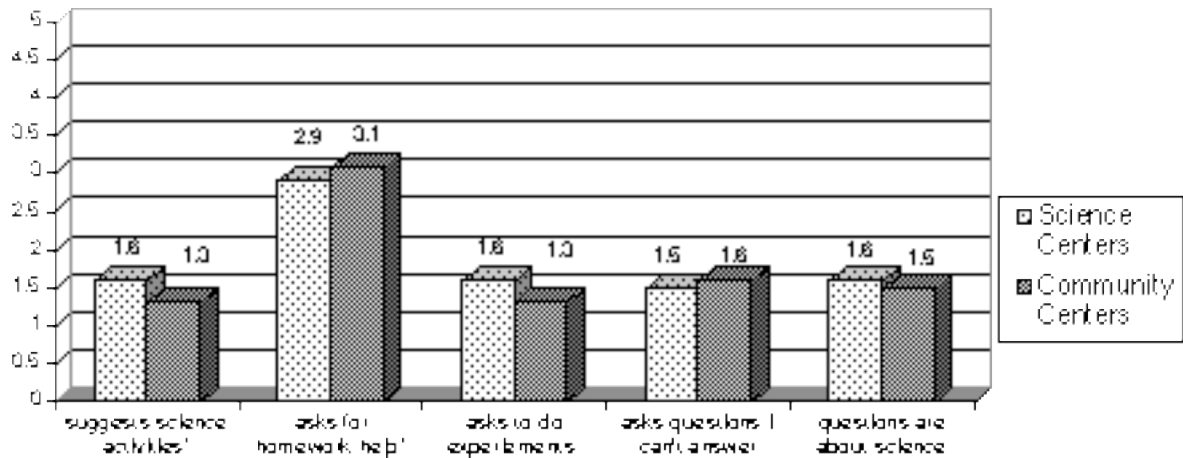


*Differences between the families receiving packets at the two sites are statistically different.

Child-initiated family discussions about nature, astronomy and animals are significantly more likely to occur within families who received the packets via science centers, and these parents also report a greater frequency of questions in general from their children.

Children Suggest Family Activities We also asked a series of questions in an attempt to profile family interactions, especially as they relate to science activities. Parents again rated frequency on the scale of one through five.

**Figure 4: Initial parent questionnaire:
Frequency of these families interaction (N=882)**

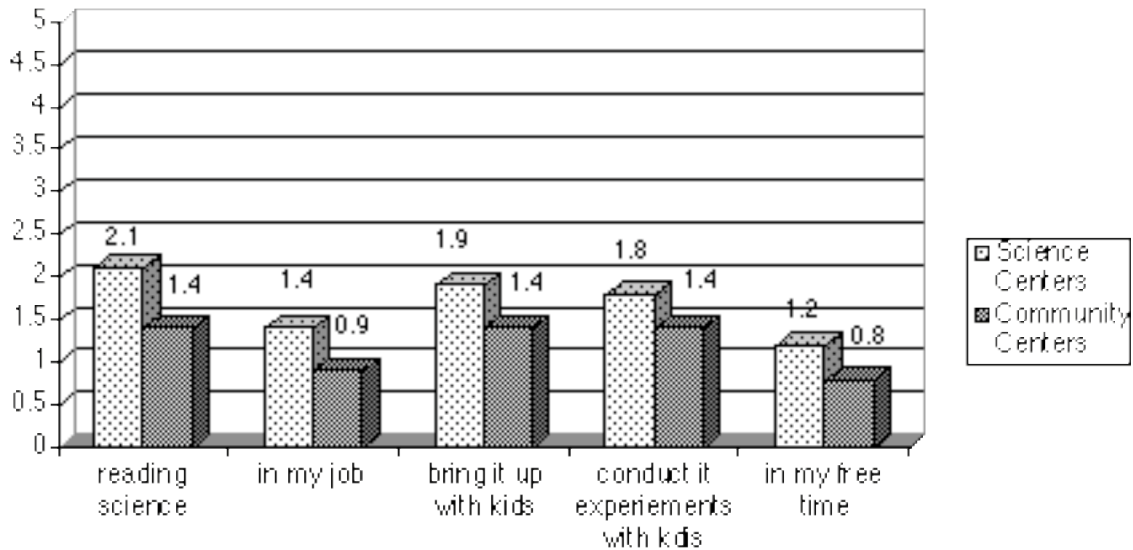


*Differences between the families receiving packets at the two sites are statistically different.

Family interaction around science was minimal in our sample. We included the more general topic of “children ask for help with homework” to compare parent responses to questions of science interaction. Next to homework, which averaged three, or “often,” science activities like doing experiments or talking about science were significantly less frequent, averaging between one and two, or “never” and “occasionally.” The only significant difference between community center and science center families occurred among responses to students requesting homework help. Homework assistance was one of the few places where community center parents, on average, perceive more interaction than science center parents do.

Parents do Science We also asked questions about adults’ experience with science and about science activities instigated by parents. Again, parents used the same rating scale as before to describe the frequency with which they participated in science activities.

**Figure 5: Initial parent questionnaire:
Average frequency of adult science activities (N=882)**



*Differences between the families receiving packets at the two sites are statistically different.

Parents who received the packets at science centers are significantly more likely to engage in science activities themselves than are those who received the packets at community centers. Clearly, the parents from science centers and those from community centers constitute two different populations of participants. Parents who attend science museum activities are often engaged in science themselves and regularly involve their children in science, too.

Reasons Parents Avoid Science at Home We asked parents a group of questions and noted their level of agreement with reasons we suggested about why parents do not do science with their children. The parents rated their agreement on a five-point scale where one was “disagree a lot,” two was “disagree a little,” three was “indifferent,” four was “agree a little” and five was “agree a lot.”

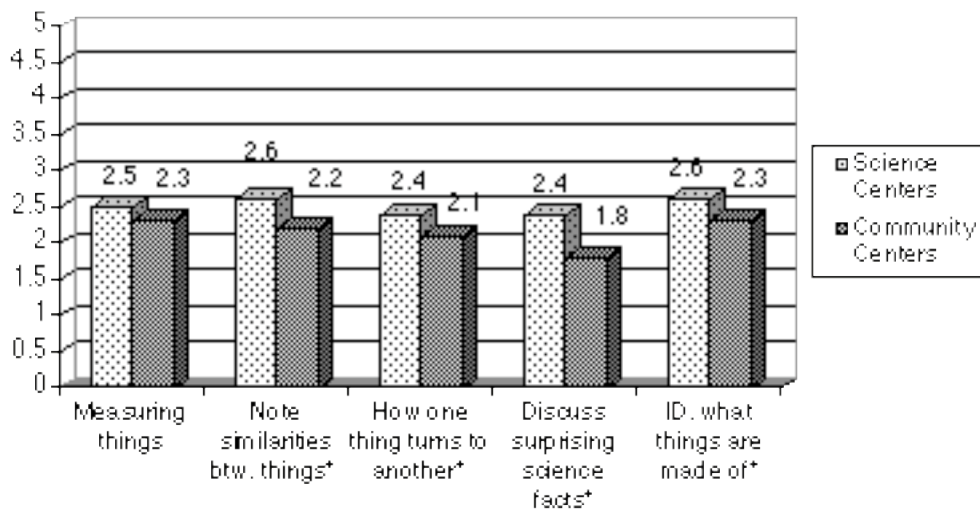
The video was designed to counter some of parents’ greatest reservations about doing science with their children. According to our baseline survey, not all of these concerns were completely accurate—on average, families disagreed with the statements: “I can’t explain science concepts,” “I don’t know where to get answers” and “I never liked science.” (See Figure 6, below.) On average, parents agreed slightly that two impediments to conducting science experiments at home are lack of time and the messiness of science? Further, overall, parents from community centers were more concerned on average than those from science centers. Three of these differences are statistically significant.

**Figure 6: Initial parent questionnaire:
Parent reasons for not doing experiments at home (N=882)**

*Differences between the families receiving packets at the two sites are statistically different.

Science Activities at Home We broke science down to activities that families do on a regular basis, but may not consider science and again asked parents with what frequency they conduct these types of activities. These included daily family conversations about how things are made or how they change and household activities like measuring things. Again, parents used the one-to-five frequency scale from “disagree a lot” to “agree a lot” for rating their responses.

**Figure 7: Initial parent questionnaire:
Frequency of science activities done at home (N=882)**



*Differences between the families receiving packets at the two sites are statistically different.

Science center parents were more likely than community center parents to participate in these regular family activities that are also components of scientific inquiry. All of the differences between the two groups were significant except for “measuring things.”

What we found three months later

Given these starting points, we expected to measure the impact of the Packet through change in parent response to the questions reviewed above. Overall, change in parents’ ideas about science and reported family activities was minimal. Among parents who viewed the video and conducted at least three experiments—the high users in this study—we found only a few statistically significant differences from before receiving and after using the Packet. After using the packets, not unpredictably, children more frequently “suggest science activities.” The opportunity to view the video and attempt a few experiments seemed to stimulate more interest in science. Also, our high users find that they agree significantly less with the statement, “I don’t know where to get answers,”

to children's questions about science. Parents seem to now have a greater sense of available resources and strategies for finding answers to their children's questions. They may also realize that they don't have to know all the answers to their child's questions about science.

Among both high-user families (three or more experiments) and low-user families, parents agreed significantly more often with the statement, "Science is messy" after using the Packet. Now that they have done it, they know what to expect and accept the consequences of participating with their child. While changing after participation, but not significantly, is the increase in average rating that parents do not do science with their kids because they have "no time," to do so. Again, the experience may have made them more aware of their inability to spend more time with their children.

While there was an increase, generally, in parents' attitudes toward engaging in science with their children and in willingness to participate in science activities with their families, we did not find these differences to be statistically significant.

Conclusions

Packet Distribution

- ◆ **Packets were distributed informally and at non-structured events.** Overall, one-third of the packets were given out during family and children's programs or daily interactions such as an after-school program. For the most part, packets were not integral to the event, but rather were handed out as a take-home gift. Further, an average of two-thirds of the agencies passed out the Packets with less than fifteen minutes of explanation.
- ◆ **Few coordinators followed up.** At only half of the sites did coordinators say they followed-up with their clients after the original distribution. Follow-up most often took the form of an informal chat about how families liked and used the Packet. A few of the science centers designed more formal evaluations, but most follow-up, like distribution, was very casual.
- ◆ **Families who received the packets at science centers tended to be more involved with science than those who received them at community centers.** In our baseline survey, science center parents did significantly more family science, talked more about science, and more participating parents had jobs that involved science.

Packet Use

- ◆ **Most people who received the kits used them in some way.** Almost all outreach coordinators thought the video and calendar would be used. Further, all but a small minority of parents reported trying some aspect of the packet.
- ◆ **Materials needed for experiments were easily located.** Parents repeatedly congratulated BILL NYE on the selection of simple, everyday household materials to illustrate science concepts.
- ◆ **Families conducted a moderate amount of experiments.** By the end of the study period, more than two-thirds of the responding families had conducted BILL NYE experiments at home. Each experiment was tried by anywhere from 5% to 40% of the group. The most frequently tried experiments in the Packet were those demonstrated on the video and found in the first two months, January and February. Since we collected data in March, this suggests parents might be proceeding through the calendar doing an experiment monthly, as intended.
- ◆ **Median use of the Packet was an hour or less.** Over half of parents reported spending under an hour using the Packets. Four in ten families spent more than one hour viewing the video and conducting experiments.
- ◆ **The BILL NYE name encouraged people to try the Packet.** Coordinators and parents noted that the children were more likely than adults to respond to BILL NYE, but the children's enthusiasm was instrumental in drawing their parents in.

- ◆ **Children viewed the video most frequently, followed by their parents.** Although the video was directed at parents, children were more likely to watch it. The majority of our responding parents also watched. Parents who received the Packet through a science center were significantly less likely to view the video than those who received it at a community center.
- ◆ **The video was a nearly universal outreach tool.** Parents offered copious accolades for the video, and the video experiments were the most popular ones, both of these across ethnic and socio-economic lines. Only a few outreach coordinators feared that their clients would not view the videos because they did not own a video player.

Packet Impact

- ◆ **Packets were well received.** Parents cited both student enjoyment and learning as outcomes from both the video and the calendar. People were not as likely to display the calendar, but found it useful and conducted a few experiments contained within.
- ◆ **The video moved people from enjoying passive, TV entertainment to active, science experimenting.** From the numerous comments and reported popularity of the video experiments, it appears that parents were moved to become active participants in home science activities by the video.
- ◆ **Parents who tried an experiment usually liked it.** Parents who conducted an experiment gave it a rating of about four on a five-point scale.
- ◆ **Time constraints and mess discourage science at home.** After using the Packets, parents who tried three or more experiments were significantly more cognizant of how time consuming and potentially messy science can be.
- ◆ **Children's interest in science increased when the Packets were used.** Two-thirds of participants said that their children "gained an interest in science" from using the Packet, and many of the remainder supplemented their answer with comments such as "my child was already interested in science," suggesting a ceiling affect. In families where the Packets were used most, there were significant increases in how often the children suggest science activities for the family. Those parents who tried three or more experiments experienced more change than other survey participants in attitudes and activities around science from before to after they used the Packets.
- ◆ **Ongoing contact about the Packets was slightly predictive of greater use of the Packets.** Although there was little formal follow-up, those agencies, primarily community centers, with ongoing contact were more successful and perhaps better prepared to encourage their clients to conduct family science experiments.
- ◆ **Parents report that they were engaged in a science activity—doing things together with their children—rather than taking them somewhere.** The fact that they were doing a science activity was thought highly beneficial to the family.

- ◆ **The Packets reached many families who had only a modest interest in science** because of their educational experiences. The Packet generated enthusiasm for attempting a science experiment at home and produced more positive attitudes towards science.

Recommendations

Future outreach efforts should continue to utilize the apparent appeal of videos.

Clarify who the intended audience of the Packet is. There is ambiguity about the audience's age level and the level of the parents' science experience, and some wonder, "Are the Packet and its contents for parents or children?"

Although the video and its messages were directed at adults, Bill Nye (and the BILL NYE series) is most recognizable to children, his usual audience. Consequently, children were the group most likely to watch the video, with or without their parents. There are certain liabilities involved in this ambiguity: Consensus among parents was that experimenting with flames and exploding baking soda demands adult supervision, but children, who may have viewed the program designed for parents, were apt to try these demonstrated experiments on their own. Parents' greatest concerns about doing the experiments revolved around issues of messiness and children's safety. Further, the appeal of the program to children, may have resulted in parents "delegating" the viewing and not benefiting from the program.

Families whose children are not in the target group or parents who have extensive experience in science were less enthusiastic about the materials. Although infrequent, criticisms of the Packet and the BILL NYE program were most often leveled by parents of children outside of the third-through-fifth-grade, target age group. Among science-savvy parents and parents of older children, we heard periodic comments about Bill Nye's wackiness being insulting to them or too "over the top." A few parents thought the program moved too fast for children younger than third grade.

These correlations suggest that clarifying the intended audience for the video or packet is tricky but may mitigate some of these concerns. Information can be provided to the facilitators in the distribution process, on the packaging, or in other associated print materials. While there is clearly a desire to broaden the audience for BILL NYE materials, the hands-on nature of these products suggest the need for greater focus. Alternatively, the project designers might attach an age-appropriate label to the activities—and ensure that a wider range of activities are included for those beyond the video series audience and for those whose families have greater science experience.

Use established distribution strategies and partners to reach target populations and maximize use of outreach gifts. The current distribution strategy reached a very diverse group of people, socio-economically, ethnically, and in terms of family size, make-up and experience with science. The BILL NYE administration should continue to clearly establish goals of each outreach and target outreach to populations accordingly through established arteries of their partner organizations.

Consider producing materials in other languages. Our research made a limited reach into the Spanish-speaking community through the development of before and after surveys in Spanish. We distributed more than 50 Spanish surveys to agency outreach

coordinators who requested them. While we received a limited number back, that may be because the Packets were in English. The emerging Spanish and Chinese language markets in the U.S. may warrant further investigation.

Provide more opportunities to receive official BILL NYE experiments. Many parents who became excited about family science as a result of their experiences with the video and calendar expressed a desire to find more BILL NYE activities. Indicative of the appeal of the packets is the fact that the most frequent critique was a desire for more experiments, either through daily or weekly calendar pages, or a longer video. One suggestion was a newsletter sent to homes periodically reminding families about family science and suggested experiments. Response cards collected by the outreach centers could serve as the mailing list for the newsletter.

A less expensive strategy—although limiting among many of the Packet recipients—would be to include more references to the experiments residing on the BILL NYE website. Suggesting a monthly (or more frequent) visit to the site would provide many families with additional science experiences and create a connection to the television series.

Provide more cautionary messages, especially for parents to join kids in doing experiments. A number of parents were critical of the minimal cautions in the Packet and the video, in particular. Parents appreciated the notion that science is accessible and simple, but they had strong concerns that children could be hurt trying the experiments without supervision. One solution might be to provide an amusing invitation at the beginning of the video to get kids to find an adult to watch the video along with them. Placing age-appropriate warnings for each activity may also help allay parent fears.

Agencies who have ongoing contact with their clients have the potential to provide more support than those with only periodic or one-time interactions. Those groups were better prepared to conduct hands-on workshops and introductions to the Packet. If future outreach projects necessitate training, distributing agents should be selected accordingly. While less involved agencies provided families with a service, their impact was more limited, given that they had less frequent contact with the families.

Tie the BILL NYE program to scholastic standards or curriculum. Parents often favorably compared science ideas as presented by BILL NYE to the school-based science that they and their children had experienced. Parents less experienced with science, especially, felt that the BILL NYE approach to science would improve current and past science curricula in schools, make it more relevant and interesting. They suggested that BILL NYE get more involved in teaching required curricula and clarifying the show's relationship to national science standards.

Provide feedback and incentives to maximize use of the kits. Although the packets were appealing, the amount of time spent with them could be extended by connecting the activities with educational incentives. The results of each experiment could be connected to something larger, so that by completing a group of activities, families would reach

some sort of conclusion about their world. It might be a scavenger hunt that takes elements from several activities to form the answer to another activity. It could be a set of clues that emerge from the experiments and that tie them together. Results or processes could be collected online, for those families who have access, and acknowledgements for creativity or problem solving might be awarded. Perhaps there are BILL NYE responses posted for alternative activities with the same materials. Chats or selected comments could be posted online to explain phenomena illustrated by the experiments or solve frustrations in conducting them. Perhaps the experiments could be tied to BILL NYE television programs or attached to individual videos in the after-broadcast market.

The idea is to create more interactions with the families who participate and who try the experiments.