AMERICAN INSTITUTES FOR RESEARCH

AIR project no. 02371.001

Evaluation of the FETCH! Activity Guide

Study Report

August 15, 2006

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Introduction

During the spring of 2006, American Institutes for Research (AIR) conducted an evaluation study on behalf of WGBH. The purpose of the study was to gather data related to the effectiveness of the FETCH! Activity Guide, which was designed to extend the teachings of a new children's show, "FETCH! with Ruff Ruffman."

The purpose of the study was to evaluate the effectiveness of print materials designed to extend the teachings of a new children's show, "FETCH! with Ruff Ruffman."

FETCH! is designed to educate children while retaining its entertainment value. WGBH's goals for the program include: 1) to help kids learn brainstorming skills, problem solving techniques and the value of teamwork, and 2) to model for viewers that solutions can be reached with perseverance and a specific application of skills, no matter what the challenge.[1]

The television show has a strong focus on science, including both content and procedural knowledge. Information is presented to viewers through activities, such as collecting and analyzing data, spending a day with a scientist, designing/engineering solutions to problems and playing games.[2]

The Activity Guide was developed for after-school program facilitators and other informal science educators to use at their facilities, either in conjunction with the television show or as stand-alone resources. The Guide is a 32-page resource, which consists of six activities designed to engage 8- to 10-year olds in hands-on science exploration. The guide includes instructions for the facilitators, pre-activity discussion questions, preparation and activity directions, National Science Education Standards, activity tips and science explanations. The resources also outline goals and rewards for the children's scientific understanding. It is important to note that viewing the show is not a prerequisite to using the Guide.

For this study, WGBH was interested in achieving the following objectives:

- Assess the activities' appeal for children (for example, do children enjoy the activities, do they realize they are learning about science, etc.?).
- Assess whether the facilitators liked the Activity Guide and deemed it appropriate for their after-school settings, as well as whether the Guide increased their understanding of science concepts and procedures and helped them feel more comfortable leading science experiments due to its structure and information.
- Evaluate the effectiveness of the Guide in enhancing children's science content and procedural knowledge.
- Evaluate the effectiveness of the Guide in enhancing children's attitudes towards science.

The study sample was a local, convenience sample, rather than a large-scale, random sample of after-school programs from across the country. Thus, the findings reported in this document are descriptive, and are not meant to be generalized to the entire population of after-school participants.

[1] http://pbskids.org/fetch
[2] Ibid.

Methods and Procedures

Study Design

AIR used a longitudinal, pre- and post-test, control and treatment group design. Children in the control group were exposed only to non-science (arts and crafts) activities, while children in the treatment group were exposed to the six FETCH! activities in the Activity Guide. The evaluation was designed to test the following aspects of science: 1) conceptual knowledge (i.e., children's understanding of specific science concepts), 2) procedural knowledge (i.e., children's understanding of science processes and procedures), and 3) the participants' attitudes towards science. The study design is illustrated in Figure 1 below.

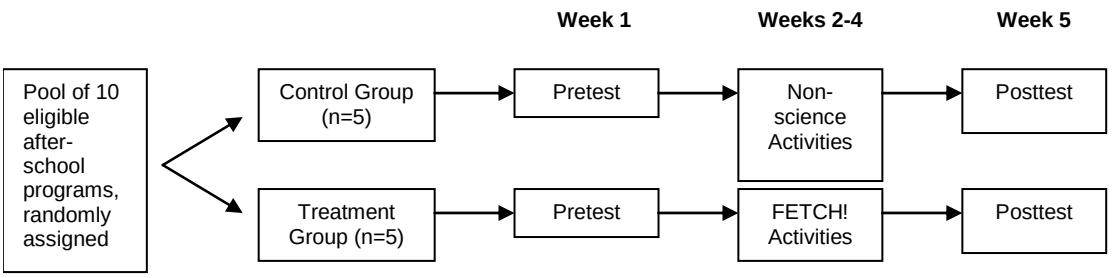

Figure 1. Pre- and post-test, control and treatment group design.

The study hypothesis was that children in the FETCH! group would exhibit greater gains in learning than the children in the control group.

Our main hypothesis was that the difference in pre- and post-test scores would be greater for the treatment group than the control group because they were exposed to the FETCH! activities and the control group was not.

Therefore, we asked both the children and after-school program facilitators to answer the same questions before and after completing all of the activities. The questions blended conceptual and procedural understanding, thus requiring that the respondents understand elements of both.

We also asked the children to respond to a series of questions about their attitudes towards science, and the facilitators to report how comfortable they were with teaching science concepts. These questions were designed to provide insight in conjunction with their knowledge of the subject, both before and after the activities.

The pre- and post-test measures are described in more detail later in the Study Materials section and appear in the Appendix.

After-school programs completed two activities per week for three weeks.

The pre-test was administered at each after-school program facility with an AIR moderator present. When the pre-test was complete, the AIR moderator gave the facilitator the Activity Guide and the supplies necessary to complete the activities. The after-school programs completed two activities per week for three weeks.

Throughout the three-week activity period of the study, an AIR staff member checked in with each facilitator once per week to ensure that they had all of the necessary materials,

that the activities were running smoothly, and to gather any feedback about the activities and the facilitator instructions (e.g., appropriateness of preparation time, clarity of directions).

Once all of the activities were complete, an AIR moderator returned to the facility to administer the post-test. Due to circumstances beyond AIR's control, some of the post-test questionnaires were administered by the after-school program facilitator. The facilitators were given proper administration instructions and returned the post-tests to AIR via mail or fax.

Study Materials

Pre-test

The pre-test included a set of ten science content and procedural knowledge questions. The questions were designed to assess the extent to which the children and facilitators could demonstrate an understanding of the following science concepts and processes/procedures:

Science concepts

- The impact of the shape of birds' beaks on their diet.
- The principle of energy transfer.
- The forces that cause boats to float.
- The force that causes kites to fly.

Science processes and procedures

- How to interpret a data chart/frequencies.
- The process of recording data/keeping detailed records.
- The process of making predictions.
- Designing experiments.
- The scientific process, e.g., making predictions, testing ideas, adjusting the experiment, retesting ideas.
- Applying problem solving skills.

In addition to science knowledge, the pre-test also assessed children's attitudes towards science. The children responded to four questions that asked them to report:

- Whether they liked spending time trying to figure out how things work,
- How much they liked science,
- How much they liked doing science experiments, and
- The importance of science (i.e., whether they think they will need to know about science when they grow up).

Finally, the pre-test included demographic questions about both the participants and the after-school programs. The children answered questions regarding their age, grade level, and race/ethnicity. The facilitators responded to questions about the after-school program, the types of activities they typically

lead and feel comfortable leading, and their experience with children of different ages. Both the child and facilitator questionnaire took approximately 15-20 minutes to complete.

During pre-test administration, children were asked to not share their answers or confer with their neighbor. They were also instructed not to discuss the answers during the study. The facilitators were instructed not to help the children with their responses.

AIR, in conjunction with members of the WGBH project team, developed the pre-test questionnaire. During the development process, a variety of pre-test questions were pilot tested with fifth grade children to help ensure that the questions were comprehensible and valid (i.e., that they were measuring the constructs that we expected them to measure). As pilot participants responded to the questions, we asked them to think-aloud and indicate words or phrases that were incomprehensible or unclear to them. We revised or eliminated questions that posed problems for the participants, and added additional questions based on feedback from WGBH.

Post-test

To measure whether the children and facilitators' science knowledge had changed, the post-test included the same knowledge and attitude questions as the pre-test. The post-test also asked the respondents to evaluate the activities and, in the case of the facilitators, to assess the facilitators' resources. The children were asked to answer 11 questions regarding whether they: 1) liked each activity, 2) learned anything new, 3) felt the activities were appropriate for their age level, 4) felt the instructions were easy to understand, and 5) considered the activities to be science, arts and crafts, school-like, or game-based.

Regardless of group, the post-test asked the facilitators to answer several questions regarding: 1) whether they completed each activity, 2) the activities' educational value, 3) the degree to which the children enjoyed the activities, 4) their overall satisfaction with the activities, and 5) whether they considered the activities to be science, arts and crafts, school-like, or game-based. The treatment group post-test asked additional questions regarding specific aspects of the Activity Guide, including, but not limited to the: 1) facilitator instructions, 2) pre-activity discussion questions, 3) preparation and activity directions, and 4) activity tips.

Study Participants

Recruiting Procedures

WGBH made initial contact with a set of after-school programs. AIR then followed-up with the programs that agreed to participate to discuss the study logistics.

75 children and 10 facilitators participated in the study.

Each program was asked to choose one facilitator and to recruit 10-12 fourth or fifth graders to participate. Once AIR had confirmed each program's participation, but before the children were recruited, each program was randomly assigned to either the treatment or control group.

Due to limited availability within each program, disruptions to the children's schedules due to special, end of the school year circumstances (e.g., day trips, summer sports leagues) and the general decline of attendance as the school year progressed, third graders were also recruited to participate. The number of participating children varied from three to 11 in each program, for a total of 75 participants. The demographic information of the after-school programs, facilitators, and children is outlined later in the Study Participants section of this report.

The programs were given a $100 donation for their participation in the study, as well as the activity supplies, worth approximately $75.

Informed consent and the protection of study participants

At the outset of the study, AIR provided a consent form for children to take home to their parents and guardians to read and discuss. The consent form described the purpose of the study and what the children would do throughout the course of the study. In addition, it stated that participation in the research was voluntary, and that the data collected would be kept private. In order to participate, the parent or guardian of each child needed to sign the form indicating they were providing informed consent for their child to participate. In addition, each child signed the form, indicating they were providing assent to participate. AIR also collected informed consent from the facilitators for their participation in the study.

To ensure that individuals participating in the study were protected from any potential risks, we sought and obtained IRB approval for this study prior to collecting any data.[3] The data collected did not and will not include identifying information (e.g., names) when shared with anyone outside the project team. We did not videotape the pre- or post-tests, nor did we take photographs of the participants in nine of the groups. An additional consent form was issued to one program, which specifically asked for parental permission to take photographs. Photographs were taken at that facility by the after-school program facilitator and AIR destroyed their copies of the pictures.

Program Characteristics

The sample consisted of ten after-school programs in the greater Boston metropolitan area. Five of the programs (two treatment, three control) were in urban locations, while the other five were in suburban towns. Four of the programs, two in the treatment group and two in the control group, were located at elementary schools, where the children remained after class hours. The other six programs, split evenly between the treatment and control groups, were drop-in programs at either community centers or under the direction of the Boys and Girls Clubs of America. Drop-in programs offer a more flexible schedule for children, who don't have to commit to specific days every week.

As part of the pre-test, we asked the facilitators to report whether their program offered science or engineering activities, and whether the children enjoyed such activities. These questions allowed the moderators to gain insight into what the children were regularly exposed to and how much they liked doing science before introducing the activities. As Table 1 on the following page shows, three out of five treatment groups and four out of five control groups reported offering science or engineering programming prior to participating in the study. Of the groups that reported offering science programming, all reported that the children in the program enjoyed the activities.

[3] AIR's Institutional Review Board (IRB) reviews all research studies at AIR to ensure that human subjects are protected. In order to receive IRB approval, studies must provide written documentation explaining the methods and procedures that will be implemented to ensure the following human subjects protection criteria will be met by the study: Risk to subjects will be minimal, risks will be balanced by benefits, human subject selection will be equitable, human subjects will be informed about risks, human subjects will give un-coerced consent, and human subject privacy and confidentiality of the data will be maintained.

Table 1:
Characteristics of the After-school Programs

Characteristic	Treatment Group (n=5) Frequency (%)	Control Group (n=5) Frequency (%)	Total (n=10) Frequency (%)
Science or engineering programming offered			
Yes	3 (60%)	4 (80%)	7 (70%)
No	1 (20%)	1 (20%)	2 (20%)
Don't know	1 (20%)	0 (0%)	1 (10%)
Children in the program enjoy science activities			
Yes	3 (60%)	4 (80%)	7 (70%)
Don't know	2 (40%)	1 (20%)	3 (30%)

Characteristics of the Children and Facilitators

The after-school program facilitators recruited fourth and fifth graders from each after-school program. Due to limited availability within each program, disruptions to the children's schedules due to special, end of the school year circumstances (e.g., day trips, summer sports leagues) and the general attrition as the school year progressed, third graders were also added to the sample. Ten facilitators and a total of 75 children participated in the study; 45 in the treatment group and 30 in the control group. This section describes the background characteristics of the individuals in our sample.

General demographic data: Children

The treatment group included 27 females and 18 males, while the control group included 20 females and 10 males. All of the participants were in the third, fourth, or fifth grade, and represented different races/ethnicities. The control group included more third graders and African-American children than the treatment group ($p < .01$, respectively), while the treatment group included more white children than the control group ($p < .01$). Table 2 provides more detail about the demographic backgrounds of our child participants.

Table 2:
Demographic Characteristics of the Children Sample

Characteristic	Treatment Group (n=45) Frequency (%)	Control Group (n=30) Frequency (%)	Total (n=75) Frequency (%)
Gender			
Female	27 (60%)	20 (67%)	47 (63%)
Male	18 (40%)	10 (33%)	28 (37%)
Grade-level			
Third**	0 (0%)	7 (23%)	7 (9%)
Fourth	23 (51%)	12 (40%)	35 (47%)
Fifth	22 (49%)	11 (37%)	33 (44%)
Race / ethnicity			
White**	26 (58%)	5 (17%)	31 (41%)
Black or African-American**	7 (16%)	11 (37%)	18 (24%)
Hispanic or Latino	6 (13%)	7 (23%)	13 (17%)
Asian	3 (7%)	1 (3%)	4 (5%)
American Indian or Alaskan Native	1 (2%)	0 (0%)	1 (1%)
Other	2 (4%)	0 (0%)	1 (1%)

** There was a statistically significant difference at the **p < .01** level between the treatment and control groups with respect to this characteristic.

Experiences with science: Children

In addition to general demographic questions, we asked the children to report where they typically take part in science activities. As Table 3 shows, children in the treatment group were more likely to report conducting science experiments at home than children in the control group ($p < .01$).

Table 3:
Where the Children Typically Conducted Science Experiments

Where kids reported doing science activities	Treatment Group (n=45) Frequency (%)	Control Group (n=30) Frequency (%)	Total (n=75) Frequency (%)
At home**	23 (51%)	8 (27%)	31 (41%)
At school	41 (91%)	26 (87%)	67 (89%)
At after-school program	16 (36%)	7 (23%)	23 (31%)
At museums or library	17 (38%)	9 (30%)	26 (35%)
Other: friends' house, camp, etc.	10 (22%)	2 (7%)	12 (16%)

Note: Totals may add up to greater than 100% because more than one answer was possible.
** There was a statistically significant difference at the **p < .01** level between the treatment and control groups with respect to this characteristic.

General demographic data: Facilitators

All of the facilitators reported having at least some college education and reported being experienced and comfortable working with children in the age range of the FETCH! target population. All the facilitators reported that educational value was important to them in choosing activities. Most of the facilitators also reported that entertainment value was important to them. Table 4 provides more detail about the demographic backgrounds of our adult participants.

Table 4:
Background Characteristics of the Group Facilitator Sample

Characteristic	Treatment (n=5) Freq (%)	Control (n=5) Freq (%)	Total (n=10) Freq (%)
Role in their after-school program			
Educator, group leader, teacher	2 (40%)	2 (40%)	4 (40%)
Supervisor, director, coordinator	3 (60%)	3 (60%)	6 (60%)
Years of after-school experience			
Less than 1 year	1 (20%)	0 (0%)	1 (10%)
1-3 years	2 (40%)	3 (60%)	5 (50%)
4-5 years	2 (40%)	2 (40%)	4 (40%)
Educational background			
Some college	0 (0%)	2 (40%)	2 (20%)
Bachelor's degree	4 (80%)	2 (40%)	6 (60%)
Graduate or professional degree	1 (20%)	1 (20%)	2 (20%)
Age group *typically work* with			
Preschool or kindergarten	1 (20%)	3 (60%)	4 (40%)
Grades 1-3	3 (60%)	5 (100%)	8 (80%)
Grades 4-6	5 (100%)	5 (100%)	10 (100%)
Middle school	0 (0%)	3 (60%)	3 (30%)
High school and Adults	0 (0%)	1 (20%)	1 (10%)
Age group *most comfortable* with			
Preschool or kindergarten	2 (40%)	3 (60%)	5 (50%)
Grades 1-3	3 (60%)	5 (100%)	8 (80%)
Grades 4-6	4 (80%)	5 (100%)	9 (90%)
Middle school	0 (0%)	4 (80%)	4 (40%)
High school and Adults	0 (0%)	4 (80%)	4 (40%)
Number of children work with			
0-20 children	1 (20%)	1 (20%)	2 (20%)
21-40 children	3 (60%)	2 (40%)	5 (50%)
More than 40 children	1 (20%)	2 (40%)	3 (30%)
Characteristics important to choosing an activity			
Subject matter	2 (40%)	5 (100%)	7 (70%)
Entertainment value	4 (80%)	4 (80%)	8 (80%)
Educational value	5 (100%)	5 (100%)	10 (100%)
Cost	2 (40%)	3 (60%)	5 (50%)
Ease of use	2 (40%)	2 (40%)	4 (40%)
Supports school curriculum	2 (40%)	2 (40%)	4 (40%)

Note: Totals may add up to greater than 100% because more than one answer was possible for some of these questions.

Experiences with teaching science: Facilitators

The majority of facilitators reported they were comfortable leading science activities.

In addition to general demographic questions, we asked the facilitators to report whether or not they typically led science activities and whether they were comfortable leading activities that were unfamiliar to them. Table 5 outlines their responses. Four out of five treatment group facilitators reported being comfortable leading science activities, while all of the control group facilitators reported being comfortable leading science activities, despite the fact that not all of them typically led such activities. Three of out five facilitators in both groups reported also being comfortable teaching topics that were unfamiliar to them.

Table 5:
Group Facilitator Self-reported Comfort Level with Science Activities

Characteristic	Treatment Group (n=5) Frequency (%)	Control Group (n=5) Frequency (%)	Total (n=10) Frequency (%)
Typically leads science activities			
Yes	2 (40%)	4 (80%)	6 (60%)
No	3 (60%)	1 (20%)	4 (40%)
Comfortable leading science activities			
Yes	4 (80%)	5 (100%)	9 (90%)
Does not ever lead science activities	1 (20%)	0 (0%)	1 (10%)
Comfortable teaching unfamiliar topics			
Yes	3 (60%)	3 (60%)	6 (60%)
Depends on the topic	2 (40%)	2 (40%)	4 (40%)

Results

Activities' Appeal: Child Data

Reactions to the activities

91% of the child respondents indicated that they "liked" or "loved" the activities—many reported they liked the activities because they learned something.

As part of the post-test, we asked the children to indicate whether they enjoyed the FETCH! activities. Of the 44 children who answered this question, forty (91%) indicated that they "liked" or "loved" the activities.[4]

We also asked the children to report *why* they liked the FETCH! activities. Twenty-five children responded, "because they were fun," while others cited the activities' creative or hands-on nature as reasons they enjoyed them.

In addition to having fun, some children notably liked the activities because they learned from them. Nine children specifically addressed science, teamwork and learning in their responses. These respondents reported they liked the activities because:

- *They let me test my own ideas.*
- *I got to learn a lot of things.*
- *They were really fun and I learned a lot.*
- *I like doing projects and science.*
- *It was fun to do them to test what was going to happen.*
- *I got to challenge my friends and I liked working in teams.*
- *You got to try new things.*
- *I just liked it because I love science in general.*

93% of the child respondents indicated that they thought the activities were good for kids their own age—95% thought their friends "might" or "would" enjoy them.

We also asked children whether they thought the activities were good for kids their own age. Of the 41 children who responded to the question, 38 (93%) indicated that they thought the activities were good for kids their own age. Only three children thought the activities were better for younger children.

In addition, we asked the children whether they thought their friends would have fun doing the FETCH! activities. Of the 41 children who responded to the question, twenty-one children (51%) indicated they thought their friends would have fun. An additional 18 children (44%) reported their friends might have fun doing the FETCH! activities.

[4] The total sample size is 45, which represents the children across all five FETCH! programs. However, not every student answered all of the questions.

Activities the children liked

After requesting feedback on the activities in general, we asked the children to indicate which specific activities they liked. Due to varying levels of attendance at each program, some of the children did not complete every activity. The table below presents the FETCH! activities in order, starting with the activity that most children reported liking.

Table 6:
Activities the Children Liked

Activity	Number of Children Who Completed the Activity	Number of Children Who Enjoyed the Activity	Percentage of Children Who Enjoyed the Activity
Ice Cream Shake	40	38	95%
Eat Like a Bird	35	30	86%
Design a Flavor	39	33	85%
Go Fly a Kite	38	28	74%
Crazy About Kites	26	20	77%
Float My Boat	29	20	69%

It is important to note that even the activity liked by the fewest children was still liked by more than two-thirds of the children who completed it.

Activities the children did not like

As illustrated by Table 6 above, most of the children liked all of the activities. However, a small number of children did not like specific activities. (Note: Subtracting the number of children who enjoyed the activity from the number who completed it in Table 6 above indicates how many children did not like a particular activity.)

Even the "least preferred" activity was liked by more than two-thirds of the children.

One or two children reported not liking an activity for the following reasons: 1) the activity was "hard," (Crazy About Kites, Eat Like a Bird), 2) they did not like the flavor choices or taste (Design a Flavor), 3) the Design a Flavor activity "didn't work," or, 4) the Eat Like a Bird activity "didn't teach…too much." However, most of the negative comments were in reference to the activities' entertainment value. Some children reported not liking an activity if they perceived that it "wasn't fun" or was "boring".

Educational value

In addition to entertainment value, we assessed the respondents' perceptions of the activities' educational value. We asked the children whether the FETCH! activities taught them any new ideas. Of the 44 children who answered this question, 19 (43%) reported learning a lot of new ideas. An additional 16 children (36%) indicated learning some new ideas. Many children reported learning how to complete the activities, i.e., to make ice cream, fly kites, sail boats, and use different kinds of beaks. However, many children also cited science concepts, experiment procedures, and teamwork as things they learned from the activities. They commented:

79% of the child respondents reported learning "some" or "a lot of" new ideas.

- *I learned about how a boat floats, ice cream freezes and how birds use their beak.*
- *We learned about teamwork.*
- *[I learned] to make predictions first.*
- *[I learned] that instead of doing everything the same to try to do it a different way.*
- *[I learned] what to do if something doesn't work.*
- *Some things are really easy to make and some are harder. But anyone can make an easy idea or a hard idea if they try.*
- *I learned that you can make ice cream by putting it in a bag with ice and salt.*
- *I learned how to make a kite different ways that will still work.*
- *[I learned that] things don't turn out right all of the time.*
- *[I learned] how to make science really fun.*
- *[I learned] that some birds have a harder time picking things up than others.*

One of the study objectives was to explore whether the children realized they were doing science, and if so, whether they enjoyed the activities despite their educational value. As previously mentioned, the majority of the children enjoyed the activities, and when we asked them to describe the FETCH! activities, thirty-six (80%) described the activities as "science" activities. Therefore, it appears that the scientific nature of the activities did not deter the children's interest. Meanwhile, 18 (40%) described the activities as "arts and crafts," 13 (29%) described them as "contests and games," and only eight children (18%) perceived the activities to be "school-like." Please note that the percentages add up to more than 100% because the children were allowed to choose more than one answer.

The FETCH! program may expose children to science activities that they are not typically receiving in school settings.

We also asked the children whether the FETCH! activities were similar to activities they were accustomed to in school. Thirty-two (71%) children indicated that they never do activities like these in school, or only sometimes do them. This provides evidence that the FETCH! program may expose children to science activities they are not typically receiving in school settings.

Activities' Appeal: Facilitator Data

Reactions to the activities

We asked the facilitators to rate the educational and entertainment value of the FETCH! activities on a scale of 1 to 4, with 1 representing the lowest rating and 4 representing the highest rating. Facilitators agreed that the activities had both educational and entertainment value. The mean "educational value" rating was 3.21 (std dev = 0.66), somewhere between "agree" and "strongly agree". The facilitators rated the "degree to which the children enjoyed the activities" with a mean of 3.28 (std dev = 0.60), also somewhere between "agree" and "strongly agree." As the scale indicates, both of these ratings are very positive.

Facilitators rated the educational value of the activities 3.21 on a scale of 1-4, with 4 representing the highest rating.

Thus, it appears that facilitators recognized the activities as resources for both learning about science and having fun. They commented:

- *The kids are really enjoying the projects and we are all learning so much.*
- *The relay race idea (for the Eat Like a Bird activity) really got the kids motivated, so I think that is the perfect way to run the activity. Afterwards we discussed what each item may represent in the real world, and talked about the difficulty that birds may have with certain items. Overall, the kids enjoyed this activity.*
- *Everyone is truly enjoying the activities. The kids loved making ice-cream and did an excellent job on the second teamwork activity. They are excited when they realize that they may already know what the outcome might be. They are all doing a great job discussing the activities once we are finished. Every child seems to be having a different experience.... some are learning a lot of new things, while others may know a little more. The projects have been very enjoyable for the teachers as well. It is nice to work together to towards creating an outcome.*
- *The kids are really enjoying the projects and we are all learning from them; who knew that you could fit 146 pennies in an aluminum foil boat and have it still float?!*

Although both the children and facilitators enjoyed the activities either for their educational or entertainment value, or a combination of both, the programs reported encountering only minor difficulties with two of the activities.

- *When it came time to turn the flavor into ice cream, we had a difficult time due to the warm weather. The ice melted very quickly and the kids had a little bit of a struggle because they had to continue shaking for an extended period of time.*
- *The 2 kite activities were definitely the most difficult for the group…The kids had some difficulty following directions, but I also think they are not very comfortable measuring or folding correctly. The directions from the packet are very clear and I do not think there were any changes that I may suggest, but I think having a visual is a definite.*

Similar to the question posed to the children, we also asked the facilitators to describe the FETCH! activities. All of the facilitators described the activities as "science." Four of the five described the activities as "arts and crafts" and "contests and games." Only two of the four described the activities as "school-like," reinforcing the children's perceptions that the FETCH! activities are different from typical school activities. Please note that the counts add up to more than five because the facilitators were allowed to choose more than one answer.

Entertainment value

The facilitators reported being impressed with the entertainment value of the activities. They commented:

- *The kids really enjoyed the activities.*
- *The kids loved the Go Fly a Kite and Eat Like a Bird activities and Ice Cream Shake. The kids enjoyed these the most because there was a lot of action taking place and a lot of fun for them to do.*
- *I really enjoyed working with the FETCH! activities. I know the kids in our program did also. I tried to make it more fun than academic and the kids liked this.*

- *The kids had fun.*

Educational value

As reported above, the facilitators agreed or strongly agreed that the FETCH! Activity Guide had educational value. Two facilitators reported that they were so impressed with the educational value of the FETCH! activities that they shared them with their entire after-school program and/or science department. They reported:

Two facilitators reported being so impressed with the educational value of the FETCH! activities that they shared them with their entire after-school program and/or science department.

- *I did share these activities with the science teachers in our school and they really enjoyed them and wanted to incorporate them into their curriculum. I think the kids really enjoyed doing the activities and other kids, when they saw what we were doing, wanted to join in. The directions were easy for me and the kids understood them also.*
- *The activities have sparked program wide attention and I wish that all of the kids had the opportunity to participate. We will have to include the projects in next year's programming.*
- *In the first ten minutes of our activity, we discussed favorite flavors of ice cream, how the kids think ice cream is made, and what ingredients they thought were in ice cream…After the kids completed their first "shake", each group was able to sample all of the other groups' finished product. We then discussed what the kids thought about the ingredients such as: Do we need more sugar? Less vanilla? More salt? ... We then made one additional batch based on the kids' suggestions. According to the kids, the last batch we made together was the best tasting. After our clean up, I spoke to the kids about the 'science' side of what we did, and we had a quick Q&A where the kids asked questions about the process of making ice cream.*
- *I feel that the kids really learned something from each activity.*

Activity Guide: Child Materials

82% of child respondents understood all or most of the Kids' Activity Sheet directions.

Child feedback

We asked the children to indicate whether the FETCH! handouts were easy to read and understand. None of the children indicated that the handouts were too difficult to understand. Thirty-seven children (82%) reported they understood most or all of the directions. An additional eight (18%) indicated that they understood at least some of the directions.

Facilitator feedback

The facilitators reported using the Kids' Activity Sheets in various ways. These ways and the number of facilitators who reported using the Sheets in each manner are summarized in the list that follows:

- *I used the Kids' Activity Sheets to prepare for and lead the activities*. (5 out of 5)
- *I used the Kids' Activity Sheets to introduce the activity*. (5 out of 5)
- *I used the Kids' Activity Sheets as handouts during the activity*. (5 out of 5)
- *I allowed the kids to take home the Kids' Activity Sheets*. (3 out of 5)

Activity Guide: Facilitator Materials

Four of the five facilitators rated the Guide as useful or very useful.

Overall effectiveness of the Activity Guide

We asked the facilitators to rate the overall effectiveness of the FETCH! Activity Guide. Four of the five facilitators rated the Guide as useful or very useful. Only one facilitator rated the Guide as somewhat useful. On a scale of 1 to 4, with 1 representing the lowest rating and 4 representing the best rating, the mean score for overall Guide usefulness was 3.20 (std dev = 0.79).

We also asked the facilitators to rate specific features of the FETCH! Activity Guide. The table below summarizes the average ratings.

Table 7:
Facilitator Activity Guide Ratings
(n = 5)

	Mean (std dev)
Usefulness of the various Guide components	3.01 (0.59)
Usefulness of the Leader Notes	3.25 (0.71)
Usefulness of the Kids' Activity Sheets	2.80 (0.20)
Overall satisfaction with the FETCH! Activity Guide	3.31 (0.59)

Note: The scales are all 1 to 4, with 1 representing the lowest ratings and 4 representing the best ratings.

Two facilitators found the Guide particularly helpful in leading the activities. They commented:

- *The leading of the activities is going well and we are finding the directions very easy to follow… The guide was useful in introducing, leading and wrapping up each activity. The discussion topics were engaging and relevant. The guide also helped with suggestions on how to change/adapt the activities.*
- *The individual instruction sheets made it very easy for me to lead the activity, as well as very easy for the kids to follow the directions…The [Activity Guide] has been very helpful in helping me prepare some of the materials ahead of time, as well as providing me with relevant discussion starters to begin each activity…I feel I have gained some great new ideas to present in our Education Center.*

The facilitators also described possible improvements that could be made to the Activity Guide. Two facilitators commented that the preparation time went beyond expectations for a few of the activities. In addition to preparation time, the facilitators noted:

- *Some of the wording on the Kids' Activity Sheets was difficult to understand in the kite building, i.e., making folds and where to cut.*
- *I found the kids really learned and had fun, but the guide wasn't the best in making me feel comfortable leading the activities.*
- *We feel that the discussion questions for the kite projects reach a bit over our kids' knowledge base and it is sometimes hard to get them to answer in a manner that is appropriate for the questions that are being asked. We brainstormed, and thought that it may work better to provide some type of leading prompts or a short story or explanation of the science/process that is involved in the activity; this may lead kids in a more meaningful direction that would*

help them put the scientific process in motion while they are performing the activity. After the kids are given a little more info, they are better at drawing on inference and they begin to share and discuss their discovery with the other kids in the group.

Knowledge and Attitudes: Child Data

As aforementioned, the pre- and post-tests included science content and procedural knowledge questions designed to assess the extent to which the children could demonstrate an understanding of the following science concepts and processes/procedures:

Science concepts

- The impact of the shape of birds' beaks on their diet.
- The principle of energy transfer.
- The forces that cause boats to float.
- The force that causes kites to fly.

Science processes and procedures

- How to interpret a data chart/frequencies.
- The process of recording data/keeping detailed records.
- The process of making predictions.
- Designing experiments.
- The scientific process, e.g., making predictions, testing ideas, adjusting the experiment, retesting ideas.
- Applying problem solving skills.

Children in the treatment group showed significantly greater gains in science content and procedural knowledge than children in the control group ($p < .01$).

Out of 11 possible points, children in the treatment group earned a mean score of 6.91 points on the science content and procedural knowledge pre-test (std dev = 1.44). Children in the control group earned a mean score of 6.33 points on the same pre-test (std dev = 1.56).

After several weeks of trying out the activities, children in the treatment group were able to earn a mean score of 7.64 points (std dev = 1.55) while the children in the control group were able to earn a mean score of 6.47 points (std dev = 1.36). We found that the difference between the groups, over time, was statistically significant ($t_{(df=130)} = -2.63$, $p < .01$).[5] Figure 2 summarizes the children's knowledge and attitude data.

[5] We controlled for the effects of time and clustered children at the program level to account for intraclass correlations (correlations within each program).

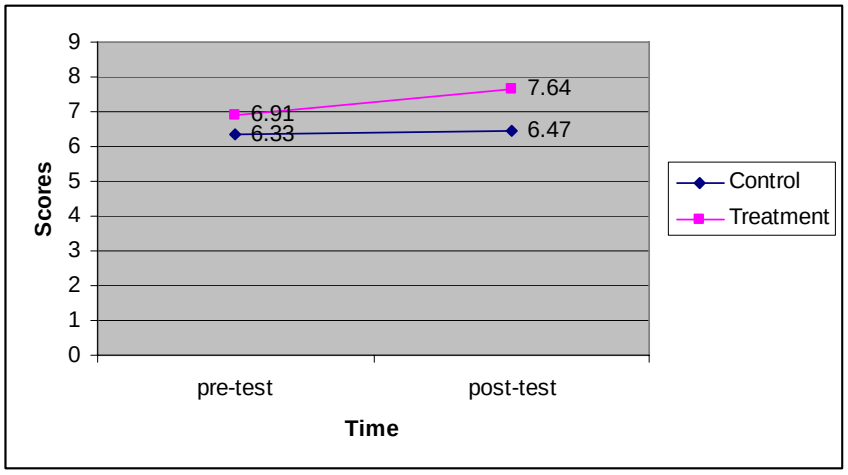

Figure 2. Children's science knowledge scores over time ($p < .01$).

Thus, it appears that the FETCH! Activity Guide was effective in teaching the children in our study sample about specific science concepts and scientific processes/procedures. These findings are especially interesting, given that the control group programs reported more exposure to science programming than the treatment groups. As Table 1 (page 6) indicates, four of the five control group programs offered science or engineering programming prior to this study, while only three of the five treatment group programs offered science/engineering programming.

We found no difference in attitudes toward science between the treatment and control groups from pre-test to post-test. The average treatment group pre-test attitude z-score was 0.11 (std dev = 0.61) while the average control group score was -0.16 (std dev = 0.71).[6] Post-test scores showed no significant improvement for either group: the treatment group score was 0.05 (std dev = 0.77) and the control group score was -0.07 (std dev = 0.68) (see Figure 3). It is possible that the children's attitudes were already high and that we observed a "ceiling effect"—that the scores couldn't increase much more. This is a question worth investigating in future studies with a larger, more representative sample of children.

[6] Z-scores have an average of 0 and a standard deviation of 1.

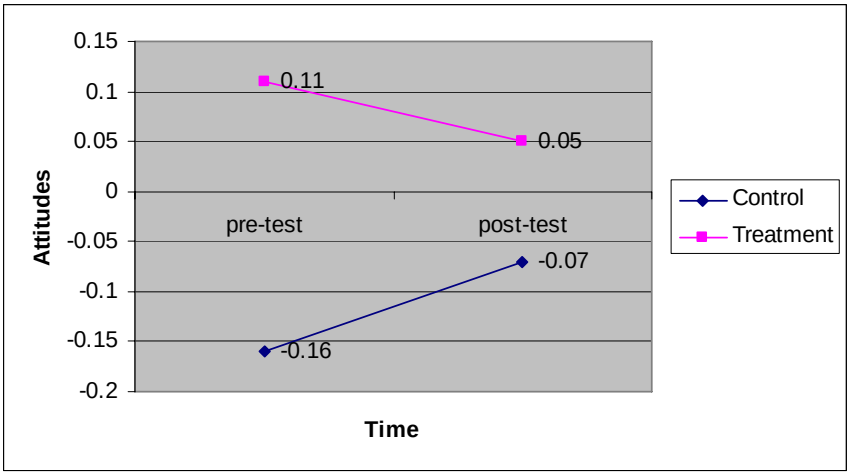

Figure 3. Children's attitudes over time (p = n.s.).

Knowledge and Attitudes: Facilitator Data

It appears that the data are trending in the expected direction—treatment group facilitators showed an increase in knowledge and attitudes.

We administered the same science knowledge questions to the facilitators. Because the facilitator sample size was so small (n = 10), we did not perform a statistical analysis of the data. However, we have presented the results here for descriptive purposes. It appears that the data are trending in the expected direction—the treatment group facilitators showed an increase in knowledge and attitudes. However, the control group facilitators also showed an increase in knowledge and the extent to which they reported being comfortable leading science activities (see Figures 4-5 and Table 8). This may have been an artifact of participating in the study. It may also be related to the fact that more facilitators in the control group reported that their programs offered science programming than the treatment group programs. Again, this is a research question that could be explored in a larger sample of after-school programs.

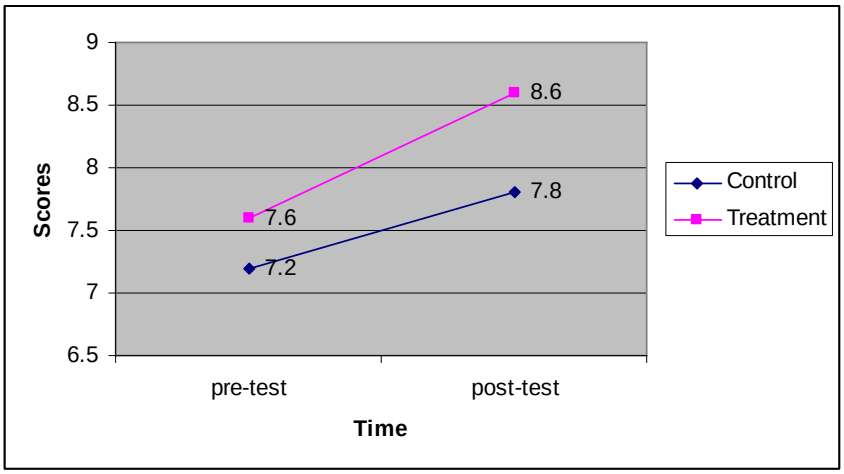

Figure 4. Facilitators' science knowledge scores over time.

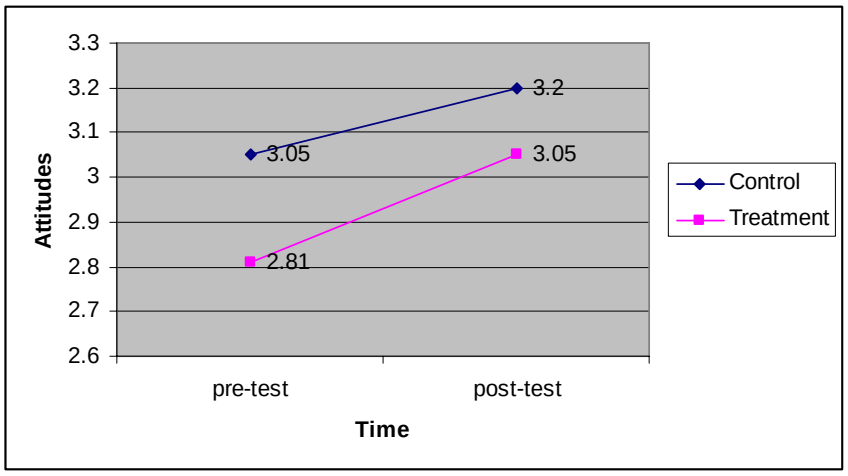

Figure 5. Facilitator attitudes toward teaching science over time.

Table 8:
Facilitator Pre-test and Post-test Scores by Group

	Pre-test Scores		**Post-test Scores**	
	Control Group Mean (std dev)	**Treatment Group** Mean (std dev)	**Control Group** Mean (std dev)	**Treatment Group** Mean (std dev)
Content and procedural knowledge measure	7.20 (1.92)	7.60 (1.34)	7.80 (1.30)	8.60 (1.14)
Attitude measure	3.05 (0.27)	2.81 (0.38)	3.20 (0.65)	3.05 (0.37)

Conclusions

This study provided evidence that the FETCH! Activity Guide was an effective tool for teaching fourth and fifth grade children in after-school programs about specific science concepts and processes. The study also provided evidence that the Guide was effective because it was uniquely engaging and quite unlike science activities that children were exposed to in school settings. More research should be performed to see if the same holds true for a nationally-representative sample of children.

With respect to the specific study objectives we found the following:

Objective #1: Assess the activities' appeal for children (for example, do children enjoy the activities, do they realize they are learning about science, etc.?).

Almost uniformly, children in our sample reported that they enjoyed the entire set of activities and thought that their friends would enjoy them, too. These findings were supported by the facilitators, who gave the materials high ratings for entertainment value. All the facilitators reported that children in their programs enjoyed the FETCH! activities. Notably, the activities reportedly were appealing to many children because they were informative and encouraged them to learn new ideas. Most of the children who did the FETCH! activities reported learning new ideas, including science concepts, science experiment procedures, and how to work as members of a team. The children's subjective ratings and qualitative comments provided further evidence that the activities were engaging and appropriate for the 8- to 10-year olds in our sample. The children in our sample also recognized that the FETCH! activities were science-based.

Objective #2: Assess whether the facilitators liked the Activity Guide and deemed it appropriate for their after-school settings, as well as whether the Guide increased their understanding of science concepts and procedures and helped them feel more comfortable leading science experiments due to its structure and information.

Overall, the facilitators reported that they were very satisfied with the Activity Guide, and found its various components and Leader Notes useful. In addition, the facilitator science content and procedural knowledge test data suggested the treatment group facilitators showed a larger increase in knowledge and attitudes than control group facilitators. Of course, these data were descriptive only but the data did suggest that the Guide was potentially effective at increasing facilitator understanding of science concepts. The data also suggested that facilitators in the treatment group felt more comfortable leading science activities (attitudes measure) after using the Guide than facilitators in the control group.

Objective #3: Evaluate the effectiveness of the Guide in enhancing children's science content and procedural knowledge.

The study provided evidence that the Activity Guide was effective in enhancing the children's science content and procedural knowledge. Children in the treatment group demonstrated significant gains in science knowledge after doing the FETCH! activities, while children in the control group did not. Facilitator feedback also supported these findings: facilitators gave the activities high ratings for educational value. In fact, two of the facilitators were so impressed with the educational content, that they reported sharing these materials with other staff members.

The data offered a potential explanation of why the Guide may have been effective. Facilitators reported that the children enjoyed learning—not only about science concepts, but also about the process of *doing science* and scientific ways of thinking. We found that children appeared to be engaged in the activities because the Guide not only taught them *what* but they also taught them *how*. Thus, it appears that the children in our sample learned about science because the teachings were presented in a uniquely engaging manner. Children reported having fun because they were learning, and learning because it was fun.

This is important because 71% of children reported that they never or only sometimes do activities like these in school. It appears that by offering hands-on activities that both engage and educate children, FETCH! may be filling an important gap in children's school-based science education.

Objective #4: Evaluate the effectiveness of the Guide in enhancing children's attitudes towards science.

We did not find a significant impact of the activities on children's attitudes toward science. This may be caused by a ceiling effect—the children's attitudes toward science were positive to begin with, and did not leave much room for improvement.

One final note: We recognize that our study sample was not representative of the larger, national population of after-school programs in the United States. Further research would provide more conclusive findings about the effectiveness of the Activity Guide for children and after-school facilitators across the nation. Regardless, the data collected throughout this study provided evidence that the FETCH! Activity Guide was easy to use, that the activities were appealing and engaging to members of their target audience, that the Guide offered educational value, and provided content that was not being provided in formal school settings.

Appendices

Appendix A: Group Leader Instructions for Participating in the Study

Group Leader Instructions for Participating in the Study

Thank you for agreeing to take part in our study for WGBH. Below we have summarized some basic information about the study. If you have any questions at all, please do not hesitate to contact **Deb Goff** at the American Institutes for Research at **978-371-8335** or **dgoff@air.org**.

1. During our first visit to your program, we will ask you, the group leader, and your students to answer a few brief questions about your backgrounds as well as some fun science questions.

2. It is really important that you only include kids whose parents have provided a permission slip. **Kids cannot be in the study without written parental permission.**

3. Over the next three weeks, we would like you to try six different activities with the same group of kids. **Please plan to do at least two activities per week.**

4. We will give you copies of the activity handouts as well as all the materials you will need to do the activities. If you find that you are missing something, please let us know as soon as possible.

5. We will check in by phone or email once per week to answer any of your questions and make sure you have everything that you need.

6. After you have completed all six activities, we will come back to your program and ask some final, follow-up questions to get your and your kids' feedback on the materials.

7. Your participation and the kids' participation in this study are completely voluntary. If, at any time, you or your kids decide you do not want to be in the study, please notify us immediately.

Thank you for all your help and have fun!

Appendix B: Group Leader Questionnaire – Pre-test

Group Leader Questionnaire – May 2006

Your name: _____

After-school program: _____

---

1. Why don't birds that drink nectar from flowers eat fish, too? *(Circle one answer)*

    a. They do not like the way fish smell
    b. They do not have the right beak shape
    c. Fish are not sweet like nectar
    d. Birds do not eat fish

2. What would you need to do to make water freeze into ice? *(Circle one answer)*

    a. Add heat energy to the water
    b. Remove heat energy from the water
    c. Add cold energy to the water
    d. Remove cold energy from the water

3. What causes boats to float? *(Circle one answer)*

    a. Water pushes on the boat's sides and bottom
    b. Water pushes down on the boat
    c. Air pushes up on the boat's sides and bottom
    d. Air pushes down on the boat's sides and bottom

4. What is the best way to get a kite to fly higher? *(Circle one answer)*

    a. Stop moving while flying the kite
    b. Add another string to the bottom of the kite
    c. Walk or skip while flying the kite
    d. Double the weight of your kite

5. Let's pretend that a group of kids voted for their favorite flavor of juice. They kept track of the votes in the table below.

Juice Flavors	Votes
Cherry	☺☺
Grape	☺☺☺☺
Orange	☺☺☺
Apple	☺☺☺☺☺☺

Which flavor is the group's favorite? *(Circle one answer)*

a. Cherry
b. Grape
c. Orange
d. Apple

6. When you make up a new recipe, why is it important to keep track of the ingredients you use? *(Circle one answer)*

a. So no one can use your recipe
b. So the food will taste different each time
c. So you can make the recipe again
d. So the food will not spoil

7. When doing an experiment… *(Circle one answer)*

a. You should make a prediction (a guess) so you know what to test out in the experiment
b. You should just see what happens without making a prediction (a guess)
c. You should make a prediction (a guess) so no one will know what you are doing
d. You should not make a prediction (a guess) because someone else might predict (or guess) the same thing

8. Let's pretend that a group of friends had a cookie baking contest. What is the fair way to find out who made the best cookies? *(Circle one answer)*

a. Ask each kid to convince everyone that his or her cookies are the best
b. Ask half of the kids what cookies they liked and write down their answers
c. Ask each kid to vote for his or her own cookies and no one else's
d. Ask each kid to try one cookie from each of the batches without knowing who made each batch and keep track of how many kids liked each one

9. True or false, scientists usually test out their ideas, change their ideas, and then test them again to make their ideas better. *(Circle one answer)*

    a. True
    b. False

10. Let's imagine that you want to build a paper airplane that flies really far. How would you solve this problem? (Hint: Think like a scientist)

Questions about You

1. What is your position/role at your after-school program?

   _____

2. How long have you been working with kids in after-school programs? *(Circle one answer)*

   a. Less than 1 year
   b. 1-3 years
   c. 4-5 years
   d. 6-10 years
   e. More than 10 years

3. What is your educational background? *(Circle one answer)*

   a. Some high school
   b. Graduated high school/GED
   c. Some college
   d. Associate degree
   e. Bachelor's degree
   f. Graduate or professional degree

4. What age group do you typically work with? *(Circle all that apply)*

   a. Preschoolers
   b. Kindergarteners
   c. Grades 1-3
   d. Grades 4-6
   e. Middle school students
   f. High school students
   g. Adults

5. What age group are you most comfortable working with? *(Circle all that apply)*

   a. Preschoolers
   b. Kindergarteners
   c. Grades 1-3
   d. Grades 4-6
   e. Middle school students
   f. High school students
   g. Adults

Why?

_____

_____

_____

6. At any given time, how many kids do you typically work with in your program? *(Circle one answer)*

    a. Less than 10
    b. 10-20
    c. 21-30
    d. 31-40
    e. 41-50
    f. Over 50

7. What types of things do you look for when you are choosing a program or activity to do with the kids? *(Circle all that apply)*

    a. Subject matter
    b. Entertainment value
    c. Educational value
    d. Cost
    e. Ease of use
    f. Supports school curriculum
    g. Other (please specify): _____

8. What types of activities/programs do you typically lead? *(Circle all that apply)*

    a. Reading
    b. Homework help
    c. Science
    d. Sports
    e. Arts and crafts
    f. Nutrition
    g. Other (please specify): _____

9. What types of activities are you most comfortable leading? *(Circle all that apply)*

    a. Reading
    b. Homework help
    c. Science
    d. Sports
    e. Arts and crafts
    f. Nutrition
    g. Other (please specify): _____

Why?

10. Are you comfortable teaching topics that may be unfamiliar to you? *(Circle one answer)*

    a. Yes
    b. No
    c. Depends on the topic

    Why or why not?

11. Does your after-school program offer any science or engineering programming? *(Circle one answer)*

    a. Yes
    b. No
    c. I don't know

    If so, please describe:

12. In your opinion, do the kids in your program enjoy science activities? *(Circle one answer)*

    a. Yes
    b. No
    c. I don't know

13. Please indicate your level of agreement with each of the following statements by placing an X in the appropriate box using a scale from Strongly Agree to Strongly Disagree.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**	**Not Applicable**
a. The kids in my program are engaged when I conduct science activities					
b. I am comfortable leading science activities					
c. I have a strong understanding of science concepts					
d. I have a strong understanding of how to conduct science experiments					

Feel free to use this space to explain further any of your answers:

14. Please provide any additional comments about your after-school program that you think we should know.

Thank you!

Appendix C: Child Questionnaire – Pre-test

Student Questionnaire – May 2006

Your name: _____

After-school program: _____

---

1. Why don't birds that drink nectar from flowers eat fish, too? *(Circle one answer)*

    a. They do not like the way fish smell
    b. They do not have the right beak shape
    c. Fish are not sweet like nectar
    d. Birds do not eat fish

2. What would you need to do to make water freeze into ice? *(Circle one answer)*

    a. Add heat energy to the water
    b. Remove heat energy from the water
    c. Add cold energy to the water
    d. Remove cold energy from the water

3. What causes boats to float? *(Circle one answer)*

    a. Water pushes on the boat's sides and bottom
    b. Water pushes down on the boat
    c. Air pushes up on the boat's sides and bottom
    d. Air pushes down on the boat's sides and bottom

4. What is the best way to get a kite to fly higher? *(Circle one answer)*

    a. Stop moving while flying the kite
    b. Add another string to the bottom of the kite
    c. Walk or skip while flying the kite
    d. Double the weight of your kite

5. Let's pretend that a group of kids voted for their favorite flavor of juice. They kept track of the votes in the table below.

Juice Flavors	Votes
Cherry	☺☺
Grape	☺☺☺☺
Orange	☺☺☺
Apple	☺☺☺☺☺☺

Which flavor is the group's favorite? *(Circle one answer)*

a. Cherry
b. Grape
c. Orange
d. Apple

6. When you make up a new recipe, why is it important to keep track of the ingredients you use? *(Circle one answer)*

a. So no one can use your recipe
b. So the food will taste different each time
c. So you can make the recipe again
d. So the food will not spoil

7. When doing an experiment… *(Circle one answer)*

a. You should make a prediction (a guess) so you know what to test out in the experiment
b. You should just see what happens without making a prediction (a guess)
c. You should make a prediction (a guess) so no one will know what you are doing
d. You should not make a prediction (a guess) because someone else might predict (or guess) the same thing

8. Let's pretend that a group of friends had a cookie baking contest. What is the fair way to find out who made the best cookies? *(Circle one answer)*

    a. Ask each kid to convince everyone that his or her cookies are the best
    b. Ask half of the kids what cookies they liked and write down their answers
    c. Ask each kid to vote for his or her own cookies and no one else's
    d. Ask each kid to try one cookie from each of the batches without knowing who made each batch and keep track of how many kids liked each one

9. True or false, scientists usually test out their ideas, change their ideas, and then test them again to make their ideas better. *(Circle one answer)*

    a. True
    b. False

10. Let's imagine that you want to build a paper airplane that flies really far. How would you solve this problem? (Hint: Think like a scientist)

Questions about You

1. Do you like spending time trying to figure out how things work? *(Circle one answer)*

    a. Yes
    b. Sometimes
    c. No

2. How much do you like science? *(Circle one answer)*

    a. I love science
    b. I like science, but I don't love it
    c. I only like science a little bit
    d. I do not like science at all

3. Do you like doing science experiments? *(Circle one answer)*

    a. I love doing science experiments
    b. I like doing science experiments, but I don't love it
    c. I only like doing science experiments a little bit
    d. I do not like doing science experiments at all
    e. I have never done a science experiment

4. Where have you done science activities? *(You may circle more than one answer)*

    a. At home
    b. At school
    c. At my after-school program
    d. At museums
    e. At the library
    f. Other: _____

5. Which of these are part of doing science? *(You may circle more than one answer)*

    a. Having a problem you are trying to solve
    b. Trying out different ideas
    c. Working in a laboratory all the time
    d. Getting only one right answer
    e. Making predictions (guesses) about what will happen
    f. Watching to see what happens
    g. Knowing for sure what is going to happen before you test an idea
    h. Taking notes
    i. Working only by yourself
    j. Changing your ideas
    k. Talking to people about your ideas
    l. Being bored
    m. Making graphs
    n. Changing something in your experiment and seeing what happens

6. Do you think you will need to know about science when you grow up? *(Circle one answer)*

    a. Yes
    b. Maybe
    c. No

7. How old are you? _____

8. What grade are you in? *(Circle one answer)*

    a. 3rd grade
    b. 4th grade
    c. 5th grade
    d. 6th grade

9. Do you go to public or private school? *(Circle one answer)*

    a. Public
    b. Private

10. What race/ethnicity are you? *(You may circle more than one answer)*

a. White
b. Black or African American
c. Hispanic or Latino
d. Asian
e. American Indian or Alaskan Native
f. Pacific Islander
g. Other: _____

THANK YOU!

Appendix D: Group Leader Treatment Group Questionnaire -- Post-test

Group Leader FETCH! Questionnaire – June 2006

Your name: _____

After-school program: _____

---

1. Why don't birds that drink nectar from flowers eat fish, too? *(Circle one answer)*

    a. They do not like the way fish smell
    b. They do not have the right beak shape
    c. Fish are not sweet like nectar
    d. Birds do not eat fish

2. What would you need to do to make water freeze into ice? *(Circle one answer)*

    a. Add heat energy to the water
    b. Remove heat energy from the water
    c. Add cold energy to the water
    d. Remove cold energy from the water

3. What causes boats to float? *(Circle one answer)*

    a. Water pushes on the boat's sides and bottom
    b. Water pushes down on the boat
    c. Air pushes up on the boat's sides and bottom
    d. Air pushes down on the boat's sides and bottom

4. What is the best way to get a kite to fly higher? *(Circle one answer)*

    a. Stop moving while flying the kite
    b. Add another string to the bottom of the kite
    c. Walk or skip while flying the kite
    d. Double the weight of your kite

5. Let's pretend that a group of kids voted for their favorite flavor of juice. They kept track of the votes in the table below.

Juice Flavors	Votes
Cherry	☺☺
Grape	☺☺☺☺
Orange	☺☺☺
Apple	☺☺☺☺☺☺

Which flavor is the group's favorite? *(Circle one answer)*

a. Cherry
b. Grape
c. Orange
d. Apple

6. When you make up a new recipe, why is it important to keep track of the ingredients you use? *(Circle one answer)*

a. So no one can use your recipe
b. So the food will taste different each time
c. So you can make the recipe again
d. So the food will not spoil

7. When doing an experiment… *(Circle one answer)*

a. You should make a prediction (a guess) so you know what to test out in the experiment
b. You should just see what happens without making a prediction (a guess)
c. You should make a prediction (a guess) so no one will know what you are doing
d. You should not make a prediction (a guess) because someone else might predict (or guess) the same thing

8. Let's pretend that a group of friends had a cookie baking contest. What is the fair way to find out who made the best cookies? *(Circle one answer)*

a. Ask each kid to convince everyone that his or her cookies are the best
b. Ask half of the kids what cookies they liked and write down their answers
c. Ask each kid to vote for his or her own cookies and no one else's
d. Ask each kid to try one cookie from each of the batches without knowing who made each batch and keep track of how many kids liked each one

9. True or false, scientists usually test out their ideas, change their ideas, and then test them again to make their ideas better. *(Circle one answer)*

    a. True
    b. False

10. Let's imagine that you want to build a paper airplane that flies really far. How would you solve this problem? (Hint: Think like a scientist)

Questions about the FETCH! Activities

For the remainder of the questionnaire, you may refer back to the FETCH! Activity Guide to help you answer the questions.

1. Please rate the overall usefulness of the FETCH! Activity Guide. *(Circle one answer)*

    a. Very useful
    b. Useful
    c. Somewhat useful
    d. Not useful at all

    Feel free to use this space to explain further your answer:

    _____

    _____

    _____

2. Please think about the following *general* components of the FETCH! Activity Guide. (We will ask you to comment on the Challenges/Activities in later questions.)

    Please rate the degree to which you found each of these general components useful, on a scale from Very Useful to Not Useful at All. *(Please place an X in the appropriate boxes)*

Components	Very Useful	Useful	Somewhat Useful	Not Useful at All	Did Not Use
a. Introduction and table of contents (p. 1)					
b. Tips for leading FETCH! Challenges (pp. 2-3)					
c. Instructions for "Setting up a FETCH! Club" (p. 4)					
d. Instructions for "Using FETCH! Activity Guide resources" (p. 29)					
e. Solve a Problem sign (p. 30)					
f. FETCH! Club membership cards (p. 31)					
g. Certificate of completion (p. 32)					
h. List of "Websites and books" (p. 33)					

    Feel free to use this space to explain further any of your answers:

    _____

    _____

    _____

3. Now we'd like you to think generally about the *Challenges/Activities* contained in the FETCH! Activity Guide (pp. 5-28). Please rate the degree to which you found the following components of the Challenges to be useful, on a scale from Very Useful to Not Useful at All.

   The first set of questions in the table ask you to rate the usefulness of the Leader Notes only. The second set of questions ask you to rate the usefulness, in your opinion, of the Kids' Activity Sheets.

   (Please place an X in the appropriate boxes)

Leader Notes	**Very Useful to Me**	**Useful to Me**	**Somewhat Useful to Me**	**Not Useful at All to Me**	**Did Not Use**
a. The instructions for leaders					
b. The discussion questions that leaders may ask the kids					
c. "Prepare Ahead" sections					
d. "Lead the Activity" sections					
e. "Materials" lists					
f. National Science Education Standards					
g. "Activity Tips" and "Game Rules"					
h. Science explanations					
Kids' Activity Sheets	**Very Useful to the Kids**	**Useful to the Kids**	**Somewhat Useful to the Kids**	**Not Useful at All to the Kids**	**Did Not Use/Don't Know**
i. The Kids' Activity Sheets, in general					
j. The instructions for kids					
k. "What to Do" sections					
l. "Chew on This" sections					
m. "Dig Deeper" sections					

Feel free to use this space to explain further any of your answers:

4. How, if at all, did you use the Kids' Activity Sheets? *(Circle all that apply)*

    a. I used the Kids' Activity Sheets to prepare for and lead the activities
    b. I used the Kids' Activity Sheets to introduce the activity
    c. I used the Kids' Activity Sheets as handouts during the activity
    d. I allowed the kids to take home the Kids' Activity Sheets
    e. I did not share the Kids' Activity Sheets with the kids
    f. I did not use the Kids' Activity Sheets at all
    g. Other (please specify): _____

5. Please indicate which activities you did with the kids in your program by placing an X in the box. If you skipped an activity, please leave the box blank.

Challenge/Activity	We did this Activity
Ice Cream Shake – when the kids shook the cream in a bag with salt and ice cubes to make ice cream	
Design a Flavor – when the kids tested different strawberry flavorings to make strawberry ice cream	
Float My Boat – when the kids made boats out of tin foil and filled them with pennies	
Eat Like a Bird – when the kids tried to pick up objects with different kinds of beaks	
Go Fly a Kite – when the kids made a kite	
Crazy About Kites – when the kids made a cat-shaped kite	

If you skipped any of the activities, please tell us why:

6. Please rate the educational value of each activity by placing an X in the appropriate box: from High Educational Value to No Educational Value.

	High Educational Value	Some Educational Value	Little Educational Value	No Educational Value	Not Applicable
Ice Cream Shake					
Design a Flavor					
Float My Boat					
Eat Like a Bird					
Go Fly a Kite					
Crazy About Kites					

Feel free to use this space to explain further any of your answers:

7. Please rate how much the kids enjoyed each activity by placing an X in the appropriate box: from The Kids Enjoyed the Activity A Lot to The Kids Did Not Enjoy the Activity At All.

	The Kids Enjoyed the Activity A Lot	The Kids Mostly Enjoyed the Activity	The Kids Enjoyed the Activity A Little	The Kids Did Not Enjoy the Activity At All	Not Applicable
Ice Cream Shake					
Design a Flavor					
Float My Boat					
Eat Like a Bird					
Go Fly a Kite					
Crazy About Kites					

Feel free to use this space to explain further any of your answers:

8. Please indicate your level of agreement with each of the following statements by placing an X in the appropriate box: from Strongly Agree to Strongly Disagree.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
a. The FETCH! Activity Guide provided stimulating activities for the kids in my program				
b. The FETCH! Activity Guide was a good tool for promoting kids' overall science inquiry process skills (e.g., planning investigations, asking questions, observing)				
c. The activities and the leader notes were helpful in the *teaching* of science concepts				
d. The activities and the leader notes made me feel *comfortable* leading science activities with the kids				
e. The leader notes helped guide my discussions about science with the kids in my program				
f. I enjoyed the activities				
g. The activities were appropriate for an after-school program				
h. The activities were appropriately challenging for the kids in my program				
i. I will recommend the FETCH! Activity Guide to a colleague				
j. I will use the FETCH! Activity Guide again with a different group of kids				

Feel free to use this space to explain further any of your answers:

9. How would you describe the FETCH! activities? *(You may circle more than one answer)*

    a. Arts and crafts
    b. Science
    c. Contests and games
    d. School-like
    e. I don't know

10. Please indicate your level of agreement with each of the following statements by placing an X in the appropriate box using a scale from Strongly Agree to Strongly Disagree.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**	**Not Applicable**
a. The kids in my program are engaged when I conduct science activities					
b. I am comfortable leading science activities					
c. I have a strong understanding of science concepts					
d. I have a strong understanding of how to conduct science experiments					

11. Please write any additional comments you wish to share about the FETCH! Activity Guide overall or the specific activities and leader notes.

Thank you!

Appendix E: Group Leader Control Group Questionnaire – Post-test

Group Leader ZOOM Questionnaire – June 2006

Your name: _____

After-school program: _____

---

1. Why don't birds that drink nectar from flowers eat fish, too? *(Circle one answer)*

    a. They do not like the way fish smell
    b. They do not have the right beak shape
    c. Fish are not sweet like nectar
    d. Birds do not eat fish

2. What would you need to do to make water freeze into ice? *(Circle one answer)*

    a. Add heat energy to the water
    b. Remove heat energy from the water
    c. Add cold energy to the water
    d. Remove cold energy from the water

3. What causes boats to float? *(Circle one answer)*

    a. Water pushes on the boat's sides and bottom
    b. Water pushes down on the boat
    c. Air pushes up on the boat's sides and bottom
    d. Air pushes down on the boat's sides and bottom

4. What is the best way to get a kite to fly higher? *(Circle one answer)*

    a. Stop moving while flying the kite
    b. Add another string to the bottom of the kite
    c. Walk or skip while flying the kite
    d. Double the weight of your kite

5. Let's pretend that a group of kids voted for their favorite flavor of juice. They kept track of the votes in the table below.

Juice Flavors	Votes
Cherry	☺☺
Grape	☺☺☺☺
Orange	☺☺☺
Apple	☺☺☺☺☺☺

Which flavor is the group's favorite? *(Circle one answer)*

a. Cherry
b. Grape
c. Orange
d. Apple

6. When you make up a new recipe, why is it important to keep track of the ingredients you use? *(Circle one answer)*

a. So no one can use your recipe
b. So the food will taste different each time
c. So you can make the recipe again
d. So the food will not spoil

7. When doing an experiment… *(Circle one answer)*

a. You should make a prediction (a guess) so you know what to test out in the experiment
b. You should just see what happens without making a prediction (a guess)
c. You should make a prediction (a guess) so no one will know what you are doing
d. You should not make a prediction (a guess) because someone else might predict (or guess) the same thing

8. Let's pretend that a group of friends had a cookie baking contest. What is the fair way to find out who made the best cookies? *(Circle one answer)*

a. Ask each kid to convince everyone that his or her cookies are the best
b. Ask half of the kids what cookies they liked and write down their answers
c. Ask each kid to vote for his or her own cookies and no one else's
d. Ask each kid to try one cookie from each of the batches without knowing who made each batch and keep track of how many kids liked each one

9. True or false, scientists usually test out their ideas, change their ideas, and then test them again to make their ideas better. *(Circle one answer)*

    a. True
    b. False

10. Let's imagine that you want to build a paper airplane that flies really far. How would you solve this problem? (Hint: Think like a scientist)

Questions about the ZOOM Activities

For the remainder of the questionnaire, you may refer back to the ZOOM handouts to help you answer the questions.

1. Please rate the overall usefulness of the ZOOM handouts. *(Circle one answer)*

    a. Very useful
    b. Useful
    c. Somewhat useful
    d. Not useful at all

    Feel free to use this space to explain further your answer:

    _____

    _____

    _____

2. Please indicate which activities you did with the kids in your program by placing an X in the box. If you skipped an activity, please leave the box blank.

Challenge/Activity	We did this Activity
Yard Cards – When the kids made cards with paper and yarn.	
Papel Picado – When the kids made pierced tissue paper	
Button Flowers – When the kids made flowers out of buttons and pipe cleaners	
Marbleized Paper – When the kids made colored paper using shaving cream and food coloring	
Bubble Stationery – When the kids made stationery and envelopes using bubbles and food coloring	
Popsicle Stick Puzzle – When the kids made a puzzle using popsicle sticks	

    If you skipped any of the activities, please tell us why:

    _____

    _____

3. Please rate the educational value of each activity by placing an X in the appropriate box: from High Educational Value to No Educational Value.

	High Educational Value	Some Educational Value	Little Educational Value	No Educational Value	Not Applicable
Yarn Cards					
Papel Picado					
Button Flowers					
Marbleized Paper					
Bubble Stationery					
Popsicle Stick Puzzle					

Feel free to use this space to explain further any of your answers:

4. Please rate how much the kids enjoyed each activity by placing an X in the appropriate box: from The Kids Enjoyed the Activity A Lot to The Kids Did Not Enjoy the Activity At All.

	The Kids Enjoyed the Activity A Lot	The Kids Mostly Enjoyed the Activity	The Kids Enjoyed the Activity A Little	The Kids Did Not Enjoy the Activity At All	Not Applicable
Yarn Cards					
Papel Picado					
Button Flowers					
Marbleized Paper					
Bubble Stationery					
Popsicle Stick Puzzle					

Feel free to use this space to explain further any of your answers:

5. Please indicate your level of agreement with each of the following statements by placing an X in the appropriate box: from Strongly Agree to Strongly Disagree.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**
a. I enjoyed the activities				
b. It was easy to carry out the activities with the kids in my program				
c. The activities were appropriate for an after-school program				
d. The activities were appropriately challenging for the kids in my program				
e. I will recommend the ZOOM handouts to a colleague				
f. I will use the ZOOM handouts again with a different group of kids				

Feel free to use this space to explain further any of your answers:

6. How would you describe the ZOOM activities? *(You may circle more than one answer)*

   a. Arts and crafts
   b. Science
   c. Contests and games
   d. School-like
   e. I don't know

7. Please indicate your level of agreement with each of the following statements by placing an X in the appropriate box using a scale from Strongly Agree to Strongly Disagree.

	Strongly Agree	**Agree**	**Disagree**	**Strongly Disagree**	**Not Applicable**
a. The kids in my program are engaged when I conduct science activities					
b. I am comfortable leading science activities					
c. I have a strong understanding of science concepts					
d. I have a strong understanding of how to conduct science experiments					

8. Please write any additional comments you wish to share about the ZOOM handouts.

Thank you!

Appendix F: Child Treatment Group Questionnaire – Post-test

Student FETCH! Questionnaire – June 2006

Your name: _____

After-school program: _____

---

1. Why don't birds that drink nectar from flowers eat fish, too? *(Circle one answer)*

    a. They do not like the way fish smell
    b. They do not have the right beak shape
    c. Fish are not sweet like nectar
    d. Birds do not eat fish

2. What would you need to do to make water freeze into ice? *(Circle one answer)*

    a. Add heat energy to the water
    b. Remove heat energy from the water
    c. Add cold energy to the water
    d. Remove cold energy from the water

3. What causes boats to float? *(Circle one answer)*

    a. Water pushes on the boat's sides and bottom
    b. Water pushes down on the boat
    c. Air pushes up on the boat's sides and bottom
    d. Air pushes down on the boat's sides and bottom

4. What is the best way to get a kite to fly higher? *(Circle one answer)*

    a. Stop moving while flying the kite
    b. Add another string to the bottom of the kite
    c. Walk or skip while flying the kite
    d. Double the weight of your kite

5. Let's pretend that a group of kids voted for their favorite flavor of juice. They kept track of the votes in the table below.

Juice Flavors	Votes
Cherry	☺☺
Grape	☺☺☺☺
Orange	☺☺☺
Apple	☺☺☺☺☺☺

Which flavor is the group's favorite? *(Circle one answer)*

a. Cherry
b. Grape
c. Orange
d. Apple

6. When you make up a new recipe, why is it important to keep track of the ingredients you use? *(Circle one answer)*

a. So no one can use your recipe
b. So the food will taste different each time
c. So you can make the recipe again
d. So the food will not spoil

7. When doing an experiment… *(Circle one answer)*

a. You should make a prediction (a guess) so you know what to test out in the experiment
b. You should just see what happens without making a prediction (a guess)
c. You should make a prediction (a guess) so no one will know what you are doing
d. You should not make a prediction (a guess) because someone else might predict (or guess) the same thing

8. Let's pretend that a group of friends had a cookie baking contest. What is the fair way to find out who made the best cookies? *(Circle one answer)*

    a. Ask each kid to convince everyone that his or her cookies are the best
    b. Ask half of the kids what cookies they liked and write down their answers
    c. Ask each kid to vote for his or her own cookies and no one else's
    d. Ask each kid to try one cookie from each of the batches without knowing who made each batch and keep track of how many kids liked each one

9. True or false, scientists usually test out their ideas, change their ideas, and then test them again to make their ideas better. *(Circle one answer)*

    a. True
    b. False

10. Let's imagine that you want to build a paper airplane that flies really far. How would you solve this problem? (Hint: Think like a scientist)

_____

_____

_____

_____

_____

_____

Questions about You

1. Do you like spending time trying to figure out how things work? *(Circle one answer)*

    a. Yes
    b. Sometimes
    c. No

2. How much do you like science? *(Circle one answer)*

    a. I love science
    b. I like science, but I don't love it
    c. I only like science a little bit
    d. I do not like science at all

3. Do you like doing science experiments? *(Circle one answer)*

    a. I love doing science experiments
    b. I like doing science experiments, but I don't love it
    c. I only like doing science experiments a little bit
    d. I do not like doing science experiments at all
    e. I have never done a science experiment

4. Where have you done science activities? *(You may circle more than one answer)*

    a. At home
    b. At school
    c. At my after-school program
    d. At museums
    e. At the library
    f. Other: _____

5. Which of these are part of doing science? *(You may circle more than one answer)*

    a. Having a problem you are trying to solve
    b. Trying out different ideas
    c. Working in a laboratory all the time
    d. Getting only one right answer
    e. Making predictions (guesses) about what will happen
    f. Watching to see what happens
    g. Knowing for sure what is going to happen before you test an idea
    h. Taking notes
    i. Working only by yourself
    j. Changing your ideas
    k. Talking to people about your ideas
    l. Being bored
    m. Making graphs
    n. Changing something in your experiment and seeing what happens

6. Do you think you will need to know about science when you grow up? *(Circle one answer)*

    a. Yes
    b. Maybe
    c. No

Questions about the FETCH! Activities

1. Did you enjoy doing the FETCH! activities with your after-school program? *(Circle one answer)*

    a. I loved the FETCH! activities
    b. I liked the FETCH! activities, but I didn't love them
    c. I only liked the FETCH! activities a little bit
    d. I did not like the FETCH! activities at all

2. Did the FETCH! activities teach you any new ideas? *(Circle one answer)*

    a. Yes, **a lot** of new ideas
    b. Yes, **some** new ideas
    c. No, they **did not** teach me any new ideas

3. What kinds of new ideas did you learn?

_____

_____

_____

_____

4. Do you think the activities are good for kids your age? *(Circle one answer)*

    a. Yes, the activities are good for kids my age
    b. No, the activities are better for older kids
    c. No, the activities are better for younger kids
    d. I don't know

5. Do you think your friends would have fun doing the FETCH! activities? *(Circle one answer)*

    a. Yes
    b. Maybe
    c. No
    d. I don't know

6. Which FETCH! activities did you try? *(Circle all the activities that you tried)*

    a. Ice Cream Shake – when you shook the cream in a bag with salt and ice cubes to make ice cream
    b. Design a Flavor – when you tested different strawberry flavorings to make strawberry ice cream
    c. Float My Boat – when you made boats out of tin foil and filled them with pennies
    d. Eat Like a Bird – when you tried to pick up objects with different kinds of beaks
    e. Go Fly a Kite – when you made a kite
    f. Crazy About Kites – when you made a cat-shaped kite

7. Which FETCH! activities did you like?

7a. Did you like the Ice Cream Shake activity?	Yes	No
7b. Did you like the Design a Flavor activity?	Yes	No
7c. Did you like the Float My Boat activity?	Yes	No
7d. Did you like the Eat Like a Bird activity?	Yes	No
7e. Did you like the Go Fly a Kite activity?	Yes	No
7f. Did you like the Crazy About Kites activity?	Yes	No

Why did you like them?

_____

_____

_____

_____

_____

8. Were there any activities that you did not like? Why didn't you like them?

_____

_____

_____

_____

_____

9. How would you describe the FETCH! activities? *(You may circle more than one answer)*

    a. Arts and crafts
    b. Science
    c. Contests and games
    d. School-like
    e. I don't know

10. Do you do activities like these in school? *(Circle one answer)*

    a. We do science activities like these **all the time** in school
    b. We **sometimes** do science activities like these in school
    c. We **never** do science activities like these in school

11. Were the FETCH! handouts easy to read and understand? *(Circle one answer)*

    a. I understood **most or all** of the directions
    b. I understood **some** of the directions
    c. I **did not** understand the directions and I had to ask somebody for help
    d. I don't know

THANK YOU!

Appendix G: Child Control Group Questionnaire – Post-test

Student ZOOM Questionnaire – June 2006

Your name: _____

After-school program: _____

---

1. Why don't birds that drink nectar from flowers eat fish, too? *(Circle one answer)*

    a. They do not like the way fish smell
    b. They do not have the right beak shape
    c. Fish are not sweet like nectar
    d. Birds do not eat fish

2. What would you need to do to make water freeze into ice? *(Circle one answer)*

    a. Add heat energy to the water
    b. Remove heat energy from the water
    c. Add cold energy to the water
    d. Remove cold energy from the water

3. What causes boats to float? *(Circle one answer)*

    a. Water pushes on the boat's sides and bottom
    b. Water pushes down on the boat
    c. Air pushes up on the boat's sides and bottom
    d. Air pushes down on the boat's sides and bottom

4. What is the best way to get a kite to fly higher? *(Circle one answer)*

    a. Stop moving while flying the kite
    b. Add another string to the bottom of the kite
    c. Walk or skip while flying the kite
    d. Double the weight of your kite

5. Let's pretend that a group of kids voted for their favorite flavor of juice. They kept track of the votes in the table below.

Juice Flavors	Votes
Cherry	☺☺
Grape	☺☺☺☺
Orange	☺☺☺
Apple	☺☺☺☺☺☺

Which flavor is the group's favorite? *(Circle one answer)*

a. Cherry
b. Grape
c. Orange
d. Apple

6. When you make up a new recipe, why is it important to keep track of the ingredients you use? *(Circle one answer)*

a. So no one can use your recipe
b. So the food will taste different each time
c. So you can make the recipe again
d. So the food will not spoil

7. When doing an experiment… *(Circle one answer)*

a. You should make a prediction (a guess) so you know what to test out in the experiment
b. You should just see what happens without making a prediction (a guess)
c. You should make a prediction (a guess) so no one will know what you are doing
d. You should not make a prediction (a guess) because someone else might predict (or guess) the same thing

8. Let's pretend that a group of friends had a cookie baking contest. What is the fair way to find out who made the best cookies? *(Circle one answer)*

    a. Ask each kid to convince everyone that his or her cookies are the best
    b. Ask half of the kids what cookies they liked and write down their answers
    c. Ask each kid to vote for his or her own cookies and no one else's
    d. Ask each kid to try one cookie from each of the batches without knowing who made each batch and keep track of how many kids liked each one

9. True or false, scientists usually test out their ideas, change their ideas, and then test them again to make their ideas better. *(Circle one answer)*

    a. True
    b. False

10. Let's imagine that you want to build a paper airplane that flies really far. How would you solve this problem? (Hint: Think like a scientist)

_____

_____

_____

_____

_____

_____

Questions about You

1. Do you like spending time trying to figure out how things work? *(Circle one answer)*

    a. Yes
    b. Sometimes
    c. No

2. How much do you like science? *(Circle one answer)*

    a. I love science
    b. I like science, but I don't love it
    c. I only like science a little bit
    d. I do not like science at all

3. Do you like doing science experiments? *(Circle one answer)*

    a. I love doing science experiments
    b. I like doing science experiments, but I don't love it
    c. I only like doing science experiments a little bit
    d. I do not like doing science experiments at all
    e. I have never done a science experiment

4. Where have you done science activities? *(You may circle more than one answer)*

    a. At home
    b. At school
    c. At my after-school program
    d. At museums
    e. At the library
    f. Other: _____

5. Which of these are part of doing science? *(You may circle more than one answer)*

    a. Having a problem you are trying to solve
    b. Trying out different ideas
    c. Working in a laboratory all the time
    d. Getting only one right answer
    e. Making predictions (guesses) about what will happen
    f. Watching to see what happens
    g. Knowing for sure what is going to happen before you test an idea
    h. Taking notes
    i. Working only by yourself
    j. Changing your ideas
    k. Talking to people about your ideas
    l. Being bored
    m. Making graphs
    n. Changing something in your experiment and seeing what happens

6. Do you think you will need to know about science when you grow up? *(Circle one answer)*

    a. Yes
    b. Maybe
    c. No

Questions about the ZOOM Activities

1. Did you enjoy doing the ZOOM activities with your after-school program? *(Circle one answer)*

    a. I loved the ZOOM activities
    b. I liked the ZOOM activities, but I didn't love them
    c. I only liked the ZOOM activities a little bit
    d. I did not like the ZOOM activities at all

2. Did the ZOOM activities teach you any new ideas? *(Circle one answer)*

    a. Yes, **a lot** of new ideas
    b. Yes, **some** new ideas
    c. No, they **did not** teach me any new ideas

3. What kinds of new ideas did you learn?

_____

_____

_____

_____

4. Do you think the activities are good for kids your age? *(Circle one answer)*

    a. Yes, the activities are good for kids my age
    b. No, the activities are better for older kids
    c. No, the activities are better for younger kids
    d. I don't know

5. Do you think your friends would have fun doing the ZOOM activities? *(Circle one answer)*

    a. Yes
    b. Maybe
    c. No
    d. I don't know

6. Which ZOOM activities did you try? *(Circle all the activities that you tried)*

    a. **Yarn Cards** – When you made cards with paper and yarn.
    b. **Papel Picado** – When you made pierced tissue paper
    c. **Button Flowers** – When you made flowers out of buttons and pipe cleaners
    d. **Marbleized Paper** – When you made colored paper using shaving cream and food coloring
    e. **Bubble Stationery** – When you made stationery and envelopes using bubbles and food coloring
    f. **Popsicle Stick Puzzle** – When you made a puzzle using popsicle sticks

7. Which ZOOM activities did you like?

7a. Did you like the Yarn Cards activity?	Yes	No
7b. Did you like the Papel Picado activity?	Yes	No
7c. Did you like the Button Flowers activity?	Yes	No
7d. Did you like the Marbleized Paper activity?	Yes	No
7e. Did you like the Bubble Stationery activity?	Yes	No
7f. Did you like the Popsicle Stick Puzzle activity?	Yes	No

Why did you like them?

_____

_____

_____

_____

_____

8. Were there any activities that you did not like? Why didn't you like them?

_____

_____

_____

_____

_____

9. How would you describe the ZOOM activities? *(You may circle more than one answer)*

    a. Arts and crafts
    b. Science
    c. Contests and games
    d. School-like
    e. I don't know

10. Do you do activities like these in school? *(Circle one answer)*

    a. We do activities like these **all the time** in school
    b. We **sometimes** do activities like these in school
    c. We **never** do activities like these in school

11. Were the ZOOM handouts easy to read and understand? *(Circle one answer)*

    a. I understood **most or all** of the directions
    b. I understood **some** of the directions
    c. I **did not** understand the directions and I had to ask somebody for help
    d. I don't know

THANK YOU!