



AMERICAN INSTITUTES FOR RESEARCH

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## Evaluation of the FETCH! Activity Guide

### Executive Summary

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## Background

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 four main study objectives were to:

- 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.

## 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 Guide. 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.

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. 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.

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.

## **Sample**

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. 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.

Ten facilitators and a total of 75 children participated in the study; 45 in the treatment group and 30 in the control group. All of the child participants were in the third, fourth, or fifth grade, and represented different races/ethnicities. 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.

## **Key Findings**

Below is a list of key findings:

#### Activities' Appeal: Child Data

- 91% of the child respondents indicated that they “liked” or “loved” the activities—many reported they liked the activities because they learned something. In addition, children referred to the activities as “fun,” and cited their creative or hands-on nature as reasons they enjoyed them.
- 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.



- Most of the child respondents reported liking all of the activities. Even the “least preferred” activity was liked by more than two-thirds of the children.
- 79% of the child respondents reported learning “some” or “a lot of” new ideas. Many of the children reported learning science concepts, experiment procedures, and teamwork.
- 80% of the children referred to the activities as “science” activities.

#### Activities’ Appeal: Facilitator Data

- Facilitators rated the educational value of the activities 3.21 on a scale of 1-4, with 4 representing the highest rating. They rated the entertainment value of the activities 3.28 on the same scale. Thus, it appears that facilitators recognized the activities as resources for both learning and having fun.
- Two of the five 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.

#### Activity Guide: Child and Facilitator Materials

- 82% of child respondents understood all or most of the Kids’ Activity Sheet directions.
- Four of the five facilitators rated the Guide as useful or very useful. Only one facilitator rated the Guide as somewhat useful.
- Facilitators rated their overall satisfaction with the FETCH! Activity Guide 3.31 on a scale of 1-4, with 4 representing the highest rating.

#### Knowledge and Attitudes: Child and Facilitator Data

- Children in the treatment group showed significantly greater gains in science content and procedural knowledge than children in the control group ( $p < .01$ ).
- 71% of children reported that they never or only sometimes do activities like these in school.
- Because the facilitator sample size was so small ( $n=10$ ), we did not perform a statistical analysis of the data. However, it appears that treatment group facilitators showed an increase in science knowledge and attitudes towards teaching science.

## **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.

