

Science Hands-On Festival for Kids

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Abstract

The Florida International University "Biscayne Bay Campus Science Club" has partaken in the Science Festival to unite schools and the community as one. The event was prepared and run in conjunction with Coral Park Elementary and other elementary schools from the Miami area as well as with the help of the students from Rockway Middle School, Miami Coral Park Senior High, Our Lady of Lourdes Academy and Belen Jesuit High School. There were approximately 250 elementary school students, 10 middle school students, 50 high school students, and 30 members of the Biscayne Bay Campus Science Club. In addition, four faculties from FIU, teachers from Coral Park Elementary, parents and grandparents were in attendance. It was a fun science family event! The Club took 40 different experiments, which were led by students who asked questions to the kids regarding the experiments and allowed them to run the experiments themselves. The club's goal was to help the students with the Science and Math sections of Florida's Comprehensive Assessment Test (FCAT). The students' understanding and interests can be largely improved by real-life hands-on experiments especially in the study of Science. By seeing how science operates on an everyday, practical level, students are more motivated to learn both in and out of the classroom. We feel that the effectiveness of this event is due in large part to the passion of the members of the club about the synergistic approach to teaching and the ability to convey this enthusiasm to the kids.

Keywords

Science, Kids, Hands-On, Club, FIU

1. Introduction

The hands-on Science and Art Festivals are a result of a collaborative effort between Maria Nunez, Principal of Coral Park Elementary School, Mayra Exposito, Milagros Delgado and the Science Club of Florida International University at Biscayne Bay Campus. These festivals were created to help kids pass tests, in particular the FCAT test. Our objective is to expand their science program and introduce new technology into their curriculum to overcome natural obstacles in their learning.

One of the key goals for the Science Festival is to use inexpensive, every day materials, allowing each child to perform hands-on experiments and activities which will supplement the established school curriculum. The children will learn experimental techniques, measurements, and results, in addition to the scientific principles involved. By doing this, we increase the children's confidence in trying new experimental methods, as well as their knowledge of, confidence in, and enthusiasm for Science, Math and the Arts.

All of the activities outlined have been thoroughly tested in the lab to ensure that they are interesting and reliable for children with a range of abilities.

2. Organization of the Festivals

The Florida International University “Biscayne Bay Campus Science Club” has partaken in the Science Festival to unite the school and the community as one. The event was prepared and run in conjunction with Coral Park Elementary and other elementary schools from the Miami area as well as with the help of students from Rockway Middle School, Miami Coral Park Senior High, Our Lady of Lourdes Academy and Belen Jesuit High School.



Picture 1: Members of the Science Club carrying the materials for the Science Festival

There were approximately 250 elementary school students, 10 middle school students, 50 high school students, 30 members of the Biscayne Bay Campus Science Club. Also, four faculties from FIU, teachers from Coral Park Elementary, and parents and grandparents were in attendance.



Picture 2: FIU Faculty, Members of the Science Club, High, Middle and Elementary School Students Teaching Each other

The planning of the activity took approximately one month. In this time we:

1. Determined how to demonstrate the relationship between Science and how to illustrate the Science FCAT questions.
2. The advisors and executive board were each given the task to research and find activities that correlated with the theme of the event.
3. One week later, everyone met to decide which were the most fun, illustrative and understandable activities for the kids. All the final decisions were presented to the members and everyone was assigned a task. Each member of the club was required to come to the lab to perform the experiment assigned in advance.
4. We hosted weekly meetings to keep our members abreast of the status of the activities for the event. As far as advertising, flyers were distributed around the neighborhood at local schools (elementary, middle and high schools), apartment buildings, science/hobby shops, malls, and the University.
5. Each of the High School students lead a group of about 10 to 12 kids under his/her supervision. They play an important role in the smooth organization of the festival as a guide.
6. The FIU students were responsible for each of the experiments displayed per table as well as to teach the high and middle school helpers the procedures to perform the experiments.

The Science and Art Festivals consist of activities in the areas of chemistry, physics, biology and environmental sciences. The science activities were divided into several units, each of which provides experiments pertaining to particular subjects. Each unit is targeted at a particular grade level and assumes students have certain math and language arts skills. In the pages that follow, you will find that the students run the experiments, as well as set places for the kids to record their hypotheses, observations and conclusions.

While each unit was geared toward developing knowledge of a specific topic, it has six equally important aspects:

- to teach scientific practice and technique
- to use science to understand math
- to encourage the students to experiment on their own
- to provide technical information about the subject area

- to improve and focus the attention of the students
- to get ready for the Florida Comprehension Assessment Test

2.1. Development Guidelines

The specific guidelines to develop the units were:

1. The activities were experiments performed solely by the students
2. The students must be able to read, perform and document the experiments themselves with the helper's supervision.
3. Each experiment was designed such that the results are sufficiently dramatic to keep the children's attention while guaranteeing a high probability of success.



Picture 3: Kids were captivated making slime with the help of the Science Club Members

4. Use of free or inexpensive materials was necessary so that enough materials can be provided for a group of at least 200 kids on a limited budget.



Picture 4: Inflating balloons with baking soda and vinegar with the participation of high and middle school students as leaders

5. Whenever possible, commonly available objects were used rather than scientific apparatus so that the kids understand that they can perform their own experiments at home with minimum financial investment.
6. Experience has shown that the kids work best in small groups so the activities and equipment were structured accordingly.
7. Each festival consists of 40-50 experiments with a time frame of 10 to 15 minutes each one. In general, each experiment took approximately 15 minutes including set-up and clean up. Follow-up discussions are recommended but were not included in the 15 minutes time estimate.
8. Each activity contains a combination of Math, Science, and Art aspects integrated as a Lab experiment.
9. Safety and good experiment protocol was stressed throughout.

2.2. How to Get Started

One of the great things about these experiments is that prior in-depth knowledge of these subjects is not required. With experimental science, the kids are teaching themselves. There are no right answers, the only important thing is that the kids observe.

Also, we can and should expect experiments to fail. It is not realistic to expect every experiment to work every time. That's part of the scientific process. The kids will hopefully learn just as much from mistakes and unexpected results.

Find helpers from high and middle schools who are willing to help. Many parents are also willing to help and the PTA organization can be a great resource. This is a very exciting opportunity for parents to get involved in their child's education. We always try to start a couple of weeks ahead of schedule and have the helpers gather the necessary materials, print or photocopy the experiments. When everything's ready, all that is left is to start the festival and have fun. You're guaranteed to learn lots of new interesting things in this process.

2.3. Festivals Tips

1. Prepare each experiment with ample time.
2. If you can find the time, try the experiment yourself or just before doing the festival.
3. The experiments are not intended to teach a subject but to reinforce what has already been taught.
4. Make sure the kids read the experiments completely before they start. This can be done given 5 minutes to the kids to read the materials individually or together in the group.
5. Spend some time beforehand discussing the activity, procedure, hypotheses, and possible outcomes, as well as safety.
6. Especially in subjects like chemistry, students' understanding and interests can be largely improved by real-life hands-on experiments, where concepts are applied to everyday events.

2.4. Equipment Logistics

Since we think it's important for the kids to get in the habit of thinking about what equipment they'll need, it is preferable to have all of the necessary equipment put out on a single table. Then each kid, in turn, comes to get the supplies. A helper may sit by the supply table to protect the supplies and help minimize the chaos, but they should tell the kids what is needed.

Because more than one group is going to use the kit, we strongly recommend having a helper be responsible for repacking and checking all of the equipment. An alternative would be to select one team from high or middle school for each experiment that is responsible for the equipment.

The materials that we use for the Science Festival for kids are bought from local stores using the Science Club's funds.

Performing the Experiments



Picture 5: The kids are working individually, but in groups of ten at the same time, avowing that someone ends up with nothing to do.



Picture 6: Even small kids can understand what is DNA using a simple model

Selecting the groups for the science festival is no different than for any other activity. We suggest giving careful thought to the selection of the groups since it is important that each child be actively involved. We organized the groups by grades to give the kids a wider range of ideas and experience, and even though we run the same experiment for everybody, the level of explanation is different and it is implemented according to the grade of the kids.



Picture 7: Making colorful butterflies with coffee filters and markers at the same time that they are learning a chromatography technique of separation.

If the experiments are successful and fun, the students will want to try to do it at home. We encouraged them to run those with parental supervision and share their discoveries with the rest of the family members.

We also want to show that what many refer to as “Science” is actually a melting pot of all the branches of science. To communicate this concept, we set tables with such attractions as a density column to display how objects dropped into the column will fall to their appropriate density, a stained glass window experiment demonstrating how the properties of liquids can be altered by different components, models of animals, study of magnetism, electricity, cells, and many more.

2.5. Participation of the Parents

We asked some parents to come in to help, either people we know or by sending home a general request for volunteers. We gave them a copy of the experiments or a hand-out with the instructions that emphasize the need to let the kids do the work.

Parents were especially helpful in getting the materials ready beforehand and making sure everything gets repacked properly afterward. We appreciated having extra adults’ help oversee the actual experiments.

The parents love the science festivals and learned more about what children are learning as the children performed each experiment and how they arrived to their own conclusions. For the children, it was also a great experience to watch their parents learn science as well.



Picture 8: Parents and Science Club Members come together teaching science for kids

3. Conclusion

It is very important to wrap up the experiment by sharing results, understanding differences, how what they saw relates to theory, interesting observations, etc. Some experiments lend themselves to tabulate the results for the entire group.

We are not looking for "right" answers, rather that hypotheses, observations and conclusions are clearly written. We helped convey to the students several valuable messages — such as that there is always something better to reach for, and though studying might be hard at times, there are ways to make learning entertaining and easier.

We feel it is not only our obligation, but our pleasure to promote and prepare younger students to be productive in any profession. Within our neighboring communities, the youth are being prepared to go into the working force many not even considering college. Many people believe this community has no hope in the future; however, the FIU Biscayne Bay Campus Science Club is trying to make a difference. Our club has to compete against the distraction of video and computer games.

The majority of our events are centered on creating awareness of science throughout the Dade County area. One of our newest and most important endeavors was the establishment of a Science Festival for kids. Through collaborations with university-based programs, as well as the cooperation of local Dade County schools, we offered our services directly to the Dade County community. The goals of this activity were to assist in improving students' performance, increase their interest in science, and provide a resource for them. We measured our success by the number of students who increased their test scores in the FCAT tests.

We take seriously the responsibility to address the needs of students who are frustrated as well as those who need extra attention due to their particular abilities. It is this extra attention that keeps students on track and makes them believe that they can succeed. With our Science, Math and Art Festival, we encouraged children to “reach for higher ground.”

The event was exciting and much appreciated, but more importantly, it planted the seeds of inspiration and motivation for future scientists.

The audience age ranged from infant to grandparents. It was a fun science family event!



Picture 9: We feel a great sense of joy and humanitarianism when we go out into the community, especially with kids and do outreach

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