An On-Campus Celebration of National Chemistry Week

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Abstract: This article describes an on-campus celebration program for National Chemistry Week (NCW) at the University of Pittsburgh at Titusville (UPT). The program, consisting of a chemistry magic show, hands-on chemistry fun, and a poster display session, was presented free of charge to the public on the Saturday of NCW. Presenting the program on campus avoided the transportation of the necessary materials, allowed the incorporation of many interesting demonstrations, and provided an opportunity for the school to showcase its state-of-the-art facilities. The program reached the public through different media, such as flyers, newspapers, and TV and radio. Over 100 people of all ages from the local community participated in the program. One of the most successful characteristics of the program was the substantial involvement of college students taking chemistry classes. Directly doing or seeing various reactions that involved changes in color or production of sound, heat, or light was stimulating and memorable. Many student participants became chemistry club members right after the events and were excited about more opportunities to explore the world of chemistry. This article also described activities highlighting the theme of NCW 1999, “Celebrating Polymers.”

Introduction

In the United States, National Chemistry Week (NCW) is celebrated annually during the second week of November. During the week, chemists all over the country spend their time and energy on outreach programs for children and the general public in an effort to increase the public’s awareness of the importance and interesting nature of chemistry [1]. Many outreach programs are presented in public settings, such as malls, children’s museums, or elementary or middle school auditoriums, where a large numbers of participants are possible. These programs are often very successful, as people of all ages, especially children, get interested and excited when they see the changes produced by chemical reactions. This type of program, however, is limited by the need to transport supplies and equipment and in finding the necessary facilities at the site. For instance, some demonstrations must be done in a hood while others require heat, either using a laboratory burner or a hot plate. Even some simple hands-on experiments may require a supply of water. Moreover, some chemicals may not be stable enough to be transported. These problems make it impractical to present some very interesting demonstrations and hands-on activities to the general public. At the University of Pittsburgh at Titusville (UPT), an on-campus outreach program has been developed for NCW celebration. This program eliminates the limitations mentioned above, and the celebration has been successfully carried out for three years [1]. In this article, we will share our successful experience in helping our community to celebrate the contributions of chemistry to society.

UPT is a two-year branch campus of the University of Pittsburgh. Titusville is a city 45 miles south of Erie, PA with about 7000 residents. The total enrollment of the university is around 500 students. The on-campus NCW outreach program, consisting of a chemistry magic show, hands-on chemistry fun, and a poster display session, is presented to the public free of charge on Saturday of NCW from 2 to 4 p.m. when parents or grandparents are able to bring their kids or grandkids to the campus. Because the program largely involves student participation, student volunteers are needed. The author of this paper, an assistant professor of chemistry at UPT, has been directing the program and advising students on their preparation for the past three years. To encourage participation, students are given extra credit in their chemistry classes. For classes with laboratories, the participation is counted toward their laboratory grades. Starting last year, outstanding participants were also rewarded with medals or certificates at the university’s Annual Student Life Award Banquet, held near the end of the school year. For students transferring to other institutions, we comment on their contributions in their recommendation letters. As a result, we are usually able to recruit more than 50 students, which is about 10% of the on campus student body, to participate in our various NCW outreach programs. To make our program known to the public, we use different media, such as flyers, articles in local newspapers, and TV and radio stations. We also contact the local elementary schools and middle schools by sending flyers directly to the school’s science teachers. The schools announce the event a few days before it is to take place and the science teachers often give their students extra credit for attending. Each year, over 100 people of all ages from the local community (including middle school science teachers and their students along with parents and grandparents) participate in our programs, and last year a conservative estimate of well over 10,000 people heard about NCW through various activities sponsored by UPT.

Chemistry Magic Show

The chemistry magic show is presented twice on Saturday afternoon by the college chemistry students in a well-equipped lecture room in UPT’s new science building. The lecture room is equipped with a movable hood, a gas line, a water line, a large TV screen connected to a live video camera, and, of course, a blackboard. It has 50 seats and it was packed with kids (K–8) and their parents and grandparents. Because all the
necessary facilities were available, many interesting demonstrations were incorporated into the presentation. Moreover, close-up views of the reactions were projected on the TV screen and important chemical equations describing the reactions were written on the blackboard. The show, therefore, offered the participants a unique real-life experience of observing and understanding many fascinating and exciting reactions.

Preparation for the magic show started at the beginning of the fall semester. After students sign up for the program, the program director works out a list of demonstration items (input from students was encouraged) and assigns each item to an appropriate pair of student volunteers. The student volunteers then make an appointment and meet with the program director in individual groups (pairs) to learn and perform the assigned experiments. After this meeting, each group is required to submit a report stating clearly and exactly how they will present and explain the experiment, including what equations are to be written on the blackboard. The emphasis is on how to present the demonstrations interestingly and effectively and how to achieve an explanation of the scientific concepts involved in terms of simple language. About two weeks before the demonstrations, the student volunteers get together and run through the program at least four times, two times without actually performing the experiments and two more times actually bringing all the necessary items to the prep room of the lecture room and performing a full dress rehearsal in the presence of other students. At this point, students become familiar with the procedures and are ready for the show. They are motivated and enthusiastic about the show and eager to present the experiments to others. The improvement in their performance within this short period is dramatic. The show is presented from the standpoint of a group project. Having all students involved allowed us all to get to know one another better,” and “Hearing the comments from the public [about the demonstrations] was very gratifying.” Several students got together after the show and established the first chemistry club on campus. Many became members of the club and were excited about more opportunities to further explore the world of chemistry.

**Hands-On Chemistry Fun**

The hands-on chemistry fun presentation is another successful feature of the program. It offers the participants an opportunity to perform some simple, safe, and interesting experiments. The items used in these experiments are selected to be mostly consumer products and household materials. It is intended to show that chemistry is not something unreachable, but that it permeates into our everyday lives, into the things we eat, use, and do. The activities are held in UPT’s general chemistry laboratory where the necessary facilities, such as water and electricity, are readily available. Twelve activities are set up on four rows of laboratory benches, allowing plenty of room for each activity. At each station, the title of the activity is posted along with the procedure and a brief explanation of the phenomenon. The student volunteers are asked to arrive an hour before the event to help set up the stations and to learn about the activities. Each volunteer is responsible for one station. This setting fosters a close interaction between the students, kids, and their parents. The kids are thrilled about the opportunity to do the experiments themselves. They are excited and amazed by the many surprising and unexpected results and very impressed when they learned that something they encounter everyday can do all those “tricks”! We have heard from different sources that many kids performed the experiments for their friends and family members as soon as they got home. One participant wrote, “This was a great experience from the standpoint of a group project. Having all students involved allowed us all to get to know one another better,” and “I would have decided right there to become a chemist! Again, many thanks to all who made National Chemistry Week come to life here at UPT!” The student volunteers loved the whole experience of the show. They not only got to do some interesting experiments but gained experience explaining and presenting the experiments in front of a large group of people. Because of the positive feedback toward their performances, they gained confidence in themselves and interest in chemistry. One student wrote, “This was a great experience from the standpoint of a group project. Having all students involved allowed us all to get to know one another better,” and “Hearing the comments from the public [about the demonstrations] was very gratifying.” Several students got together after the show and established the first chemistry club on campus. Many became members of the club and were excited about more opportunities to further explore the world of chemistry.

During the show, all students know exactly what to say. They follow the procedures accurately and precisely and the demonstrations are carried out successfully. The presentation attracts the attention of the audience throughout the whole show (Figure 1). Young audience members ask questions after many of the demonstrations and comment on how much they like them. One can hear the audience wowing throughout the show. After the show, one observer stated, “The program went so smoothly and all the students were all so well-spoken, it was like watching a PBS show.” A professor of humanities and English at UPT wrote an article to the campus newsletter, “If for any reason you missed the chemistry magic demonstrations put on by the chemistry students last Saturday, you really missed education at its best. I was glad to see all the students from campus and children with parents from the community obviously enjoying the presentations…. If I had been sitting in such an audience a number of years ago, I know I would have decided right there to become a chemist! Again, many thanks to all who made National Chemistry Week come to life here at UPT!” The student volunteers loved the whole experience of the show. They not only got to do some interesting experiments but gained experience explaining and presenting the experiments in front of a large group of people. Because of the positive feedback toward their performances, they gained confidence in themselves and interest in chemistry. One student wrote, “This was a great experience from the standpoint of a group project. Having all students involved allowed us all to get to know one another better,” and “Hearing the comments from the public [about the demonstrations] was very gratifying.” Several students got together after the show and established the first chemistry club on campus. Many became members of the club and were excited about more opportunities to further explore the world of chemistry.