Tips to Create an Exhibit that Rocks!

Thank you for creating a fun and interactive hands-on exhibit for the USA Science & Engineering Expo! It is people like you who are willing to donate their resources and time that make the Festival and the Expo possible. We hope to attract more than 200,000 people over the two-day event and each exhibit can anticipate reaching between 6,000-10,000 people per day. The following are some exhibit design tips. (Many of you have done this before and may have great suggestions. Please forward them to Larry Bock at biobock@mac.com and we will incorporate them into the next version of this guide.)

Booth Design Tips:

- People learn in three main ways: by listening, by seeing, or by experiencing or touching. Creating a booth that engages all three learning modalities will reach the greatest number of people.
- All booths should be targeted at a tenth grade science understanding or below. That is to say booths can be targeted at very young children but conversely should not overwhelm the audience with the science. Ideally, all booths will be staffed with a "Meet the Scientist" or "Meet the Engineer" so the subject matter can be brought up a level if so engaged.

- Plan your booth around one main 'take home' message to be conveyed in an interactive hands-on activity.
- Keep in mind, "wiz-bang" demonstrations can be exciting to present but are also very 'static' to audiences. Participants love to touch things and be physically active in the learning process. They find interactive hands-on activities the most fun and memorable.

- Create your activity with efficiency in mind. Consider how to most effectively reach 6,000-10,000 people per day with your activity. Activities should only take a few minutes and be presentable to 5-6 participants at a time and booths should be designed with throughput in mind.

- An activity can be 'high tech' like letting kids explore virtual reality headsets or 'low-tech' like making virus particles with marshmallows and tooth picks. The goal is an interactive activity that teaches your 'take home' message.

- Decorate your booth to be visually attractive through table and tent decorations. We will provide a template for signage that meets National Park Service regulations

- Matching outfits for your staff and volunteers (and potentially participants) are highly encouraged. Matching t-shirts or lab coats let people know who to direct their questions to. You may also consider buying USA Science & Engineering Festival T-shirts for your crew ahead of time.

- Hands-on activities can involve getting kids' hands or clothing messy or dirty. Please bring any necessary cleaning materials (paper towels, trashbags, ect.) for your participants. Keep in mind any safety precautions for an activity and plan accordingly if your booth requires lab coats, gloves or safety glasses. Keep in mind you will have a wide range of children with a variety of hands-on/lab experience and kids **love** to dig in and get messy.

Helpful tips for your staff and volunteers:

- Volunteering for an explanatory booth can be both exciting and exhausting!
- Make sure everyone is well trained beforehand.
- Volunteers should be at least college age or older.
- Keep some experts on-hand at all times so that kids can "Meet the Scientist or Engineer". Their expertise adds a unique level of teaching to your booth.
- At least 2-3 people should staff the booth at all times to help with explaining and crowd control.
- Have the volunteers overlap shifts so that they can observe the activity.
- Have enough volunteers for shifts of 2-3 hours long. If you are limited to a number of people, have them rotate throughout the day and explore other booths for a few hours to help refresh them.

Don't forget to bring:

- Water and lozenges for your volunteers who will be talking all day.
- Lunch and snacks
- Hand sanitizer, Kleenex, cleaning wipes, first aid kit, paper towels

Most of all: **HAVE FUN!!**

After the Expo:

We have a goal of preparing a compendium of case studies and best practices for exhibit design that can be shared with other festival organizers. Please take lots of pictures of your booth and volunteers and send them to Larry Bock at biobock@mac.com. In your email, please briefly summarize the goals of your exhibit and lessons learned.

Example Booth Hewlett-Packard: Thermal Ink Jet Printing and Ink Chemistry

- Concept: Thermal Ink Jet

- Take home message: Images made from Thermal Ink Jet (TIJ) printers are created by a serious of dots of ink on a piece of paper. TIJ is a simple process that requires the heating of ink in order to 'shoot' or 'jet' an ink drop onto paper in order to generate a dot. Ink drop placement in an image relies upon complicated ink chemistry and paper interactions. This booth demonstrated in a simple hands-on activity some of the complicated aspects of ink chemistry such as developing the proper thickness (viscosity) for an ink-drop and the idea of 'shooting' an ink drop from a print head.

How the message was conveyed:

- **Visually**: A poster was created with the various steps of the thermal ink-jet process. An accompanying printer that was taken apart and was also available for the kids to explore.

- **Hands-on activity**: Ink and printing

Step 1: The kids were given a plastic pipette and a dilute glue mixture that was their 'ink' and were told that they were a 'printer'. During the course of the activity they would 'print' with various 'ink' mixtures and try to hit a target on a piece of paper with their 'ink'.

Step 2: The kids took a pipette with an un-thickened 'ink' mixture and tried to hit a target on a piece of paper. The un-thickened 'ink' mixture typically spread around and would not stay on the intended target or make a good drop on the paper. This step demonstrated how an ink of the wrong thickness or viscosity did not interact well with the paper surface chemistry. We introduced the term viscosity to the students and tried to have them demonstrate their understanding of the term by asking the question: ***What do we need to do to improve our 'ink' mixture?*** (Answer: increase the viscosity and add color)

Step 3: They added a colored Borax solution to their 'ink' that colored and thickened their 'ink' mixture. We asked: ***What has happened to the ink mixture?*** Again, we were trying to get the kids to use the new technical term viscosity and say that the mixture had increased in viscosity.

Step 4: They attempted to 'print' their new 'ink' mixture by squeezing it from the pipette and tried to hit a target on a piece of paper from a distance which also demonstrated the very large relative print head to paper proximity.

Step 5: The kids then added even more of the colored Borax solution. Now their 'ink' was too thick to 'print.' We asked the students: ***Is this a good ink? What is wrong with the 'ink'?*** This step got the kids to recall and again try to use the term *viscosity* correctly and say that their new 'ink' was now ***too*** viscous and didn't print well. This helped demonstrate the take-home message that ink chemistry is complicated and has to be fine tuned in order to interact well with paper and print well out of an ink cartridge.

Step 6: The "ink", paper and other used supplies were tossed into a trash bag making way for the next round of participants.

This booth was created by Hewlett-Packard, an industrial company, so all of the volunteers were scientists from Hewlett-Packard who were able to add value and insight to each step of thermal inkjet printing.

We will see you at the Expo on the National Mall on October 23 and 24, 2010!