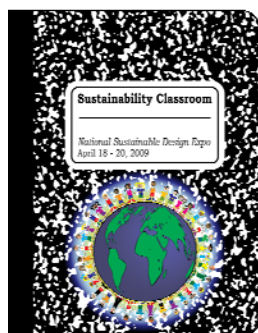




Introduction:

The *Sustainability Classroom on the Mall* project was created in order to bring basic concepts of sustainability, sustainable design, green chemistry and "green" living to the general public. The *Classroom* had two components: 1) interactive activities to engage children and adults around topics of sustainability, and 2) industrial sponsors and partners displaying information through interactive exhibits to engage the public around real-world examples of sustainability initiatives. The interactive activities were set-up to be centered on the industrial participants, in order to maximize interactions between the public, the activities and the industrial partners.



The main activities presented by beyond**benign** at the *Sustainability Classroom* are titled "e-Factor," "Solar Cells," "Crayons," "You Be the Judge," "Defining Sustainability," and "Synonyms Simplify." Each of these activities focused on concepts central to sustainable design and green chemistry. Our activities were also tied to the real-world examples of sustainable technology provided by our industry participants. These real-world examples not only reinforced the concepts conveyed in our activities, but also demonstrated how sustainable science plays a role in people's daily lives and how science is integral in providing solutions to environmental problems.

The focus of the interactive activities was centered on the general public, including K-12 age children, their parents, teachers and community members. Our approach was to present and guide inquiry-based activities in a non-intimidating and open setting that brought together basic concepts in science and real-world, sustainable examples in a meaningful and interactive manner that engaged children and adults equally. Activities appropriate for multiple age groups were used, including activities to define sustainability, atom economy and waste reduction, renewable energy, renewable feedstocks and environmentally benign chemistry. An additional activity that required children to interact with college students in the P3 expo tent was developed.

Interactive Activities:



e-Factor:

The "e-Factor" activity taught the sustainability concept of "zero waste" through a fun activity involving candy that comes in different colors (M&M's, Mike & Ike's or Skittles). The activity also provided an opportunity to discuss waste streams, the amount and types of waste typically generated by various industries and how some industries are trying to reduce their waste and prevent pollution through different means, including renewable feed-stocks, recycling and alternative processes. The "e-Factor" activity was originally designed for elementary and middle school age kids, but proved equally engaging to parents and community members.

Crayons:

The "crayons" activity provided an opportunity to discuss alternative feed-stocks and hazardous materials in a very basic and simple manner, using crayons made by middle school children and coloring books created by high school students as a starting point. This activity provided the opportunity to discuss additional sustainability concepts such as "designing for degradation" and "designing safer products." Coloring books that highlighted sustainable products made for an excellent starting point for engaging the public on discussions of sustainability.



Solar Cells:

The "solar cell" activity centers on the well-know concepts of "sustainable" or "renewable" energy. The hands-on activity allowed children (and adults) of all ages the opportunity to build and test their own working solar cell using entirely non-toxic materials. Concepts of pollution prevention, less hazardous processes, safer solvents, catalysis and energy efficiency were discussed during the exercise. At the "classroom on the mall", every adult and child who was able to participate in this activity did so, even though it required 20-30 minutes to complete.

You Be the Judge:

The "You Be the Judge" activity was designed with teenagers in mind and required visiting teens to rate the technologies presented by the college students in the P3 exhibitors' tent as if they were the judges. Teens selected several exhibits and based their ratings on how college P3 team members answered a series of questions centered on the three main components of sustainability (social equity, environment and economy). Less than half of the teens who visited the classroom participated in

My Name is _____
I am from _____

National Sustainable Design Expo
Washington, DC - April 18-20, 2009 www.nsdexpo.gov/P3

P3 Student Design Competition Worksheet:
You be the judge!

Step 1: Visit the student teams tents and take a look at all the cool technologies that college students have brought to the expo.

Step 2: Which ones do you like the best? Select your favorite 4 projects.

Step 3: Go back to the exhibits for your favorite four student teams.

Step 4: Find a student exhibitor to talk to. Ask them the three essential sustainability questions below and record their answers in the space provided. (You may choose to draw an illustration in place of writing the answer)

this activity but all who did participate enjoyed it and came back to the classroom tent with interesting conclusions. Each participating teen was given a t-shirt as a prize for their efforts as judges.

Defining Sustainability and Synonym Simplify:

The "Designing Sustainability" activity provided an opportunity for small groups to derive the definition of sustainability by brainstorming about what is important to them and/or what they would like their children to have for their lives. Similarly, the "Synonyms Simplify" activity provided an opportunity for small groups to become familiar with the 12 Principles of Green Chemistry by working out basic sustainability concepts in their own words. These two activities were used sparingly because the nearly constant flow of visitors to the classroom required our staff's attention at other activities.

Industrial partners:

The core industry participants at the classroom tent were Genovation Cars, XLR8SUN, Sheehy Automotive, GreenFloors, Willard InterContinental, Dow, DuPont, The American Chemistry Council, Royal DSM, Eco-Coach and Omnova. Most of these industry participants provided hands-on materials that visitors could touch and discuss with industry representatives. Each of these participating companies provided examples and materials of sustainable design that related directly to the activities presented by beyondbenign staff and to the sustainable design P3 researcher exhibits in the neighboring National Sustainable Design Expo P3 tent.



The chemical industry participants provided examples of waste minimization, less hazardous products & processes, solvent recycling and energy efficiency. The three automobile industry participants provided examples of vehicles that use renewable energy, hybrid technology and renewable feed-stocks. The two "home and construction" industry participants provided examples of building materials derived from renewable feed-stocks or derived from recycled materials. The sole hospitality industry participant provided excellent examples of how sustainable design, materials, technology and behaviors can transform any living space into a green space.



By having community activities under the same tent with industrial exhibits, interesting interactions and conversations were fostered. The proximity of the industry examples to the classroom activities allowed parents to comfortably hold adult discussions on sustainable design while children were engaged in the sustainable activities. Likewise, the proximity of the classroom to the industry examples allowed children to look at, touch and talk about sustainable materials and processes, why they are considered sustainable and why sustainability is important.

Outcomes:

Our anticipated outcomes for the "classroom on the mall" were four-fold:

- a. increased awareness of environmental problems & science based solutions
- b. increased interest in topics sustainable design, sustainable science and green chemistry
- c. increased awareness of current successes, research and efforts in sustainability
- d. increased motivation to become environmental stewards by participants

Over the course of the weekend, we engaged over 1,000 people of all ages. Of that amount, we estimate that at least 50% were K-12 children, with the vast majority of those children being elementary and middle school age. We estimate that the average visitor to our "classroom on the mall" spent 25 minutes doing activities or engaged in conversation with staff and industry representatives inside the classroom tent.



The National Sustainable Design Expo took place from Noon on Saturday, April 18th through 3:00pm Monday, April 20th. Each day of the event had a different composition of visitors and a noticeably different flow of visitors through the "Sustainability Classroom." Unfortunately, the third day of the event was literally washed out by the rain and the resulting flooding of a quarter of the classroom tent. Saturday and Sunday, however, were beautiful days - warm and dry - with plenty of walking traffic. On Saturday we averaged fifteen new people every fifteen minutes; on Sunday, we averaged from twenty to twenty-five new people every fifteen minutes. The foot traffic on Saturday was very consistent, whereas on Sunday it was more variable.



Overall, the Sustainable Classroom on the Mall was a successful event where children, parents and community members were engaged around discussions and activities based on sustainability, green design and green chemistry. The industrial participants were key in grounding the activities and exhibits on real-world, sustainable products and processes. The interactive activities were found to be successful at pulling in families and interested people passing by to foster discussions around sustainability. In only two days of exhibition, the beyondbenign staff at the Classroom was able to begin discussions, spark dialogue, perform activities and hopefully plant a few seeds to grow future sustainable scientists.