



NATIONAL SOCIETY OF BLACK ENGINEERS

Informal Science & Engineering Fair Implementation Guide

VERSION #1.1

JUNE 2011



Overview

A “reverse” science fair; instead of the traditional science fair where students present their discoveries to judges, we as the experts in the field will present our knowledge and demonstrations to youth to encourage them to consider entering a STEM field. This will present a mixture of booths with demonstrations and explanations and interactive activities for students to walk through in groups.

Chapters will host demonstration and activity booths in order to increase the involvement of chapters. This opportunity will also engage chapters in TORCH and Technical Excellence programming at home. Chapters will be invited to participate at one of 3 degrees of engagement: designing an original demonstration/ activity, implementing a prescribed idea, or staffing a completely prepared activity.

This event is best suited for FRC’s or as a National Engineers Week event for a chapter to host in collaboration with other engineering student professional societies on their campus. This guide was developed based on the event held at Convention in 2010 with many resources from ZOOM.

Audience

This event should be hosted to bring youth from the surrounding area (campus or convention site) to the campus or convention site for an afternoon. At conferences, this event is not a workshop for registered PCI to attend, but a free event for the community. The PCI committee should be aware of the event and afforded the option of a table in the entrance/ exit area to pass literature, or to include literature along with other materials printed for the event.

Logistics

Here are some things to consider:

- Logistics from 2010 Convention:
 - Saturday 1-4pm with room available 11-5
 - The room is 43" x 68" with just under 3000 sq ft of usable space.
- Registration-logistics how to enter for participants (no badges)
- PCI also participate like collegiate?
- Age range of students
- How to reach out to community
 - Via PCI committee
 - Via local chapters’ torch programs



Tips for Planning

- Work closely with the CPC ahead of time. Create a written division of responsibility and a method for checking progress and communicating
- Work with CPC or WHQ registration contact to determine registration method.
- Request space near the registration/entrance if possible so guests can easily get to the fair.
- Ask Career Fair exhibitors for extra information/bags to pass out to the kids as they enter.
- Request volunteers from CPC or an active TORCH chapter to stuff bags for the event the day before.

Sample Booths

Title	Welcome
STEM Field	
Staffing	<i>Planning committee + selected volunteers</i>
Description	Welcome, overview and staging space. As students enter they'll be grouped up and held here getting an overview of what to look for and what NSBE is before moving out into the rest of the space in groups.
Materials	--

Title	Ask an Engineer
STEM Field	
Staffing	<i>Collegiate and Alumni Members, various</i>
Description	This space will be covered by 10-15 NSBE members from various STEM backgrounds throughout the fair. Here students will have the opportunity to ask members about why they chose their fields, what they do for work, and how they got there. This will give members and students an additional opportunity for individual interaction. Single slide profiles of NSBE members both in the booth and others, will rotate with a quick fact or two to encourage students to approach this booth.
Materials	--



Snap Circuits	
STEM Field	Electrical Engineering
Staffing	<i>Minimum 3</i>
Description	Kids will build a variety of circuits using a kit. Components snap together and onto boards and the kit includes directions for all of the projects.
Materials	Will be provided by the TORCH committee, on site upon chapter arrival <ul style="list-style-type: none"> • Snap Circuit kits • Signage • Directions/ handouts

Cauldron Bubbles	
STEM Field	Chemistry
Staffing	<i>Minimum 3</i>
Description	Explore interactions with water, oil and salt. First the students add salt to a cup with water and oil in it. Then they experiment by substituting sugar and sand for the salt.
Materials	Will be provided by the TORCH committee, on site upon chapter arrival <ul style="list-style-type: none"> • Water • Salt • Sugar • Sand • Vegetable oil • Clear plastic cups • Signage • Directions/handouts

Color Splash	
STEM Field	Chemistry
Staffing	<i>Minimum 3</i>
Description	Explore how food color, water and oil interact. Later they experiment with vinegar instead of water.
Materials	Will be provided by the TORCH committee, on site upon chapter arrival <ul style="list-style-type: none"> • Water • Vegetable oil • Food coloring



	<ul style="list-style-type: none"> • Vinegar • Clear plastic cups • Stirrers • Signage • Directions/handouts
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Glider	
STEM Field	Physics
Staffing	<i>Minimum 3</i>
Description	Build a paper airplane and see how different modifications affect its performance.
Materials	Will be provided by the TORCH committee, on site upon chapter arrival <ul style="list-style-type: none"> • 8.5x 11” paper in various weights • Tape • Paper clips • Scissors • Signage • Directions/handouts

Gum drop domes	
STEM Field	Civil Engineering
Staffing	<i>Minimum 3</i>
Description	The kids will build domes using gum drops and toothpicks, each working with a different assigned shape as the major design of their structure. Then they’ll compare which shapes worked the best
Materials	Will be provided by the TORCH committee, on site upon chapter arrival <ul style="list-style-type: none"> • Gum drops • Tooth picks • Signage • Directions/handouts

Lego Man	
STEM Field	Industrial Engineering/Computer Engineering
Staffing	<i>Minimum 3</i>
Description	Two students or groups of students will each build a figure out of legos and record instructions on how to create it. The figures will be hidden from the other group and the instructions and a set of matching lego pieces will be



	traded. Each group will attempt to build the other group's figure based on the instructions and then they will get to see the original.
Materials	<p>Will be provided by the TORCH committee, on site upon chapter arrival</p> <ul style="list-style-type: none"> • 5 pairs of lego kits/projects • Pencils • Paper • Signage • Directions/handouts

The Food We Eat	
STEM Field	Chemistry
Staffing	<i>Minimum 3</i>
Description	Students will experiment to discover the amount of iron in various cereals, eventually being able to move the cereal across a plate of water with a magnet.
Materials	<p>Will be provided by the TORCH committee, on site upon chapter arrival</p> <ul style="list-style-type: none"> • Various cereals (some with high iron content) • Plates • Strong magnets • Water • Ziplock bags • Signage • Directions/handouts

LED Toys	
STEM Field	Electrical Engineering
Staffing	<i>Minimum 3</i>
Description	Students will experiment to discover the amount of iron in various cereals, eventually being able to move the cereal across a plate of water with a magnet.
Materials	<p>Will be provided by the TORCH committee, on site upon chapter arrival</p> <ul style="list-style-type: none"> • LEDs • Craft supplies • Signage • Directions/handouts

Bouncing Balls	
STEM Field	Electrical Engineering



Staffing	<i>Minimum 3</i>
Description	Students will experiment to discover the amount of iron in various cereals, eventually being able to move the cereal across a plate of water with a magnet.
Materials	Will be provided by the TORCH committee, on site upon chapter arrival <ul style="list-style-type: none"> • LEDs • Craft supplies • Signage • Directions/handouts

Title	Demonstrations (TBD)
STEM Field	Various, as many as possible
Staffing	<i>A chapter/group of chapters, by application, min 3 facilitators, corporate sponsors or other organizations may also sponsor demonstrations</i>
Description	Demonstrations will highlight the “wow” factor of science and engineering with things that are not practical to engage large groups in.
Materials	Will be provided by the presenter, committee may support shipping/setup costs.

Materials

These items need to be ordered and delivered to the conference location

- Activity supplies
- Printing
 - Per activity
 - Host instructions
 - Table instructions
 - Take home- handouts
 - PCI information if available
 - Ask an engineer booth
 - Information about general engineering careers
 - Welcome/guide/program
 - Surveys
- Signage
- Registration/ Check-in

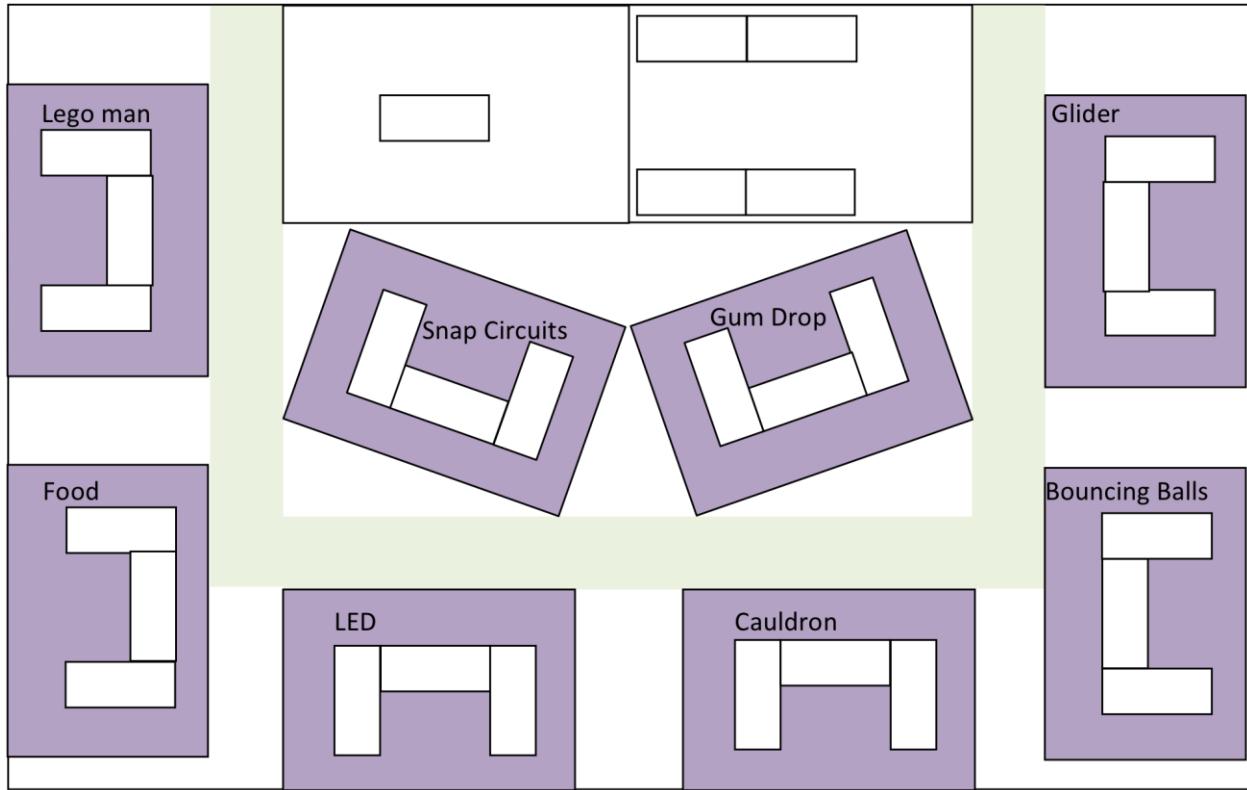


Implementation Timeline

This is the plan for a Convention Informal Science and Engineering Fair, it will need to be modified for smaller scaled conferences.

Month	
July	Submit FRF to CPC
August	Promote Informal Science & Engineering as an option for chapter projects
September	Help chapters prepare for TORCH month
October	Begin looking for proposed projects Support chapters through activity library for TORCH month
November	Invite chapters from FRC events to participate in Convention event Reach out to chapters local to convention site about sources of youth
December	Reach out to community organizations to invite groups of students & their families
January	Deadline for chapter-designed projects Order supplies for convention
February	Send any materials to be printed to WHQ staff for convention Send floor plan to CPC
March	Reminders and follow up with chapters Confirm floor plan with CPC upon arrival
April	Transition report Thank you for chapter participants

Setup





Chapter Participation Packet

Informal Science and Engineering Fair – National Convention 2010

Greetings Chapter Leaders,

At National Convention this year the TORCH Committee intends to have a significant presence. We will have a school supply drive, blood drives and host an Informal Science and Engineering Fair on Saturday, March 26th. Informal Science and Engineering is a new component to the TORCH program and as such we'd like to use Convention to share it with the membership and positively impact the Toronto Community. This type of activity is the best way for us to use our technical skills and knowledge as engineers to leave behind something positive in a convention city.

The Informal Science and Engineering Fair will be effectively a “reverse” science fair. Instead of the traditional science fair where students present their discoveries to judges, we as the experts in the field will present our knowledge and demonstrations to youth to encourage them to consider entering a STEM field. There will be a mixture of booths with demonstrations and explanations and interactive activities for students to walk through in groups.

There will be two general booths, one with general information and one called, “Ask an Engineer.” Members can sign up for shifts in the Ask an Engineer booth as individuals using the same intent form.

Chapters will host demonstration and activity booths. This is also an opportunity to try out an activity and gain some additional experience before engaging in TORCH programming in your local community. As a chapter you can design an original activity or demonstration, implement a rough idea that we provide or staff a booth for an activity that is already provided by the TORCH Committee.

Please submit the intent form online: <http://bit.ly/NSBE2010ISEfair> by February 14th. If you chose a chapter designed activity or demo you will be asked to provide a brief description. Sarah Brown, Informal Science and Engineering Coordinator, will follow up with each submission and the status of your request. The projects will be funded by the TORCH budget; all your chapter has to do is send a few volunteers for one afternoon!

The following page provides more information on the opportunities for your chapter or individual members to participate in the Informal Science and Engineering Fair.



Sincerely,

Sarah Brown

Informal Science and Engineering Coordinator

TORCH Committee

Pre-Selected Activity Booths

The detailed activity sheets for these activities are included in the .PDF package. All of these activities are courtesy of the PBS TV show ZOOM. <insert activities that will be used here, in a similar format to above for chapters to get sufficient information>

Chapter Designed Activity Booths

Chapters can design also create their own activity. The Informal Science and Engineering Coordinator will work closely with the chapter to design the activity and make sure that it is audience appropriate and will fit in with the day. Feel free to implement one of the ideas below, come up with an original one or use one you've seen somewhere else. After submitting the online form, the chapter will be contacted by the Informal Science and Engineering Coordinator for more information and to fully develop the activity, handouts, material list, and include necessary supplies in the budget for the program.

Some things to keep in mind:

- Activities must be able to be completed in approximately 10 minutes so that the event can have the feel of a fair.
- Students will be middle school aged
- Messy activities will be difficult to facilitate
- The “booth” will have 3 tables in a u-shape for the facilitators to stand on the inside and students to complete their activities from the outside by default.

Some sample ideas that need to be further developed with aid from a chapter to be able to be a booth:

- Snap circuits: these kits include various projects with buzzers etc. The students assemble circuits by snapping together the plastic pieces as indicated by instruction sheets.



- What's in the food we eat?: For example some cereals have a lot of iron in them, so with a strong enough magnet a piece of cereal can be moved around if floating in water to reduce friction.
- Secret codes: Modern electronics use various encoding methods to transmit, process, and store information. Students can encode decode messages using a simple method or learn about codes and then make up their own.

But of course you're also welcome to come up with an idea completely on your own.

Demonstration Booth

Demonstrations will highlight the “wow” factor of science and engineering with things that are not practical to engage large groups in. Demonstrate a cool experiment, or something you've built. Be sure that students in middle school can understand whatever you present.

Ask an Engineer Booth

This area will be like a panel but less formal. Discuss with kids as they pass through why you chose to be an engineer and the steps that you took to get there. We will look to have a variety of members in different ages, degrees, and fields of engineering.