



Activities and Conversations about Synthetic Biology

Kit Application Overview – Teen Science Café

<http://www.buildingwithbiology.org>

Revised 8-31-2016

PROJECT PURPOSE

The purpose of the *Building with Biology* project is to create conversations in informal science education settings among scientists and public audiences about the emerging field of synthetic biology and its societal implications. A Teen Science Café can be a great setting for this.

Synthetic biology uses new techniques combining biology and engineering to make new or modified living things and materials. The field is exploring where biology-based products might provide solutions to a wide diversity of problems in health, energy, and the environment.

BUILDING WITH BIOLOGY KIT

Two-hundred (200) free physical kits were fabricated for use in *Building with Biology* events and conversations nationwide. **A limited number of kits are still available for Teen Science Café members to incorporate into Cafés.** Kits include:

- Six hands-on activities and a forum program to stimulate conversations among scientists and public. A second forum option is available for download online at <http://www.buildingwithbiology.org/forums>
- Professional development, educational and training materials, and planning and marketing resources

Please note that in addition to the physical kit, a digital version of the kit is also available online for free download at <http://www.buildingwithbiology.org/digital-kit-contents>.

TIMELINE

As of August 31, 2016, 175 physical kits have been awarded; 25 kits are still available

- **September 31, 2016:** Deadline to apply for a *Building with Biology* physical kit
- **October 2016 - June 2017:** Host a Teen Science Café using the *Building with Biology* kit
- **Three weeks after hosting Café:** Final *Building with Biology* site report due online

REQUIREMENTS

Teen Science Café members receiving a kit are required to:

- **Host a Teen Science Café (Event):** Host at least one Teen Science Café that uses the *Building with Biology* kit to create conversations among scientist and public (teen) audiences about the emerging field of synthetic biology and its societal implications. Cafés should take place before June 30, 2017. Materials for the *Building with Biology* dialogue programs, called “forums,” are included in the kit and available online, and were designed as one- to two-hour long facilitated discussions for teens and adults that promote exploration of a topic and foster dialogue and deliberation. Café organizers are encouraged to familiarize themselves with kit materials used for the event, including the forum and hands-on activities.
- **Teen Science Café - Scientist Collaborations:** Teen Science Café members holding events must collaborate with at least one scientist, however, additional scientists including science students, or members of the synthetic biology or related fields would be a great addition to the conversations. Hands-on activities can also be another great addition to your event as a pre-Café icebreaker activity or included as part of the actual discussion. Café organizers and/or scientist volunteers (or perhaps your teen leaders) could facilitate the hands-on activities for your Café participants. There are both printed and video resources to help prepare activity facilitators. (Teen Science Cafés hosting events please see information provided on pages 4-6 for advice on finding volunteer scientists; NISE Network regional hub leaders will also assist Café hosts to help find local collaborators if you would like the help.)
- **An orientation prior to the Café for the scientist participant(s)** is required. The kit contains materials you can use for that purpose and there are also optional online resources available.
- **Final Event Report:** You are required to submit an online report within three weeks following your Café that includes email addresses from event volunteers (scientists or not) who are 18 years and older and are willing to participate in a post-event volunteer survey.

Resources:

We held and recorded several webinars earlier this year for event hosts and scientist volunteers using the kit this past summer. They are available to watch online if you would like to know more.

- **Online recording** [What’s in Your Building with Biology Kit webinar](#) (for hosts)
- **Online training for hosts:** Recordings of the online trainings for event hosts are available online at <http://www.buildingwithbiology.org/blog/online-project-orientations-and-workshops>.
- **Online training in public engagement for scientists:** Recordings of the online scientist trainings focusing on public engagement and science communication skills are available online at <http://www.buildingwithbiology.org/blog/online-project-orientations-and-workshops>.

ELIGIBILITY

The physical kit is designed for informal science educational events and public outreach. To be eligible to receive a physical kit, organizations must be:

- An organization in the U.S. that does public informal science outreach and education:
 - 1) **Informal science education organizations**
including science museums, science centers, children's museums, Teen Science Café groups, STEM and Boy and Girl Scouts, and other
 - 2) **College or university education outreach programs and DIY bio centers**
this may include individual scientists and iGEM team outreach efforts

Please note that organizations located outside the United States and K-12 schools are **not** eligible to receive physical kits. Digital kits are available to all online for free download at <http://www.buildingwithbiology.org/digital-kit-contents>.

APPLICATION PROCESS

Applications must be submitted online using SurveyGizmo by September 31, 2016

<http://www.surveymzmo.com/s3/2342311/Building-with-Biology-Kit-Application>

Please note that it is NOT possible to save your work in the SurveyGizmo online form and return for additional edits. Reports left idle for too long will go blank when you progress to the next screen. Please plan to complete the online report in one session. You may want to write your responses in a Word doc, save, and then cut and paste that information into the report. You may download the application in PDF and Word Document formats at <http://www.buildingwithbiology.org/get-involved>.

SELECTION PROCESS

Building with Biology kits will be awarded through a competitive award process. The project team will review the kit applications and award kits only to organizations that meet the eligibility criteria. We will be looking to select applications that demonstrate strong alignment with the project purpose, that comply with the project terms, and that represent geographic diversity. **Applicants will be informed of their award status in early October 2016.**

REPORTING REQUIREMENTS

Physical kit recipients are required to complete a short online report describing their Café experiences using the kit. Required reports should be submitted online within three weeks of holding your event. We also encourage event hosts to collect email addresses from event volunteers (scientists or not) who are 18 years and older and are willing to participate in a post-event survey. (Event hosts should submit volunteer email address via the required online report within three weeks of hosting the *Building with Biology* event.)

The required online Building with Biology Final Event Report is submitted at: <http://bit.ly/BwBreport>

MORE INFORMATION

For project questions and inquiries, please send an email to buildingwithbiology@mos.org.

HOW TO FIND A SCIENTIST IN YOUR AREA

The project requires informal science education organizations to collaborate with scientists. Scientists may include professors and research staff from universities, iGEM team members, undergraduate and graduate students, and representatives from DIY Bio centers and industry.

Who you choose collaborate with is a **local** decision; but receipt of a physical kit does require collaboration between informal science education organizations and scientists. *Building with Biology* regional hub leaders can assist you in finding local collaborators in your geographic area. Kits will include training and orientation materials to help prepare event volunteers and staff for conversations with the public about synthetic biology.

Here are a few suggestions for finding a scientist in your area:

- **Local colleges:** Many colleges and universities have synthetic biology scientists on staff. Some colleges have synthetic biology programs but you may often find people in this field located in a variety of departments including genetics, microbiology, molecular biology, biological engineering, and chemical engineering; once you connect with a faculty or staff member they can also suggest undergraduate and graduate students who could volunteer at your event
- **Professional societies with local chapters:** Below are a few examples:
 - The **American Society for Biochemistry and Molecular Biology (ASBMB)** purpose is to advance the science of biochemistry and molecular biology; ASBMB has thousands of members in the United States; a list of student chapters is available here: <http://www.asbmb.org/education/studentchapters/regions/>
You can add your event here: <http://www.asbmb.org/Outreach/Map/>
 - **Society for Biological Engineers** have several student chapters in the United State; a list of student chapters is available here: <http://www.aiche.org/sbe/community/students/chapters>
 - **American Chemical Society (ACS)** has 185 local sections in the United States: <http://webapps.acs.org/llookup/>
<http://www.acs.org/content/acs/en/membership-and-networks/l/websites.html>
- **iGEM Teams:** The iGEM Foundation is dedicated to education and competition, advancement of synthetic biology, and the development of open community and collaboration. The iGEM Competition designed for college students studying synthetic biology; there are over 70 active iGEM teams located in the United States as well as many iGEM alumni: http://igem.org/Team_List.cgi?year=2015
- **DIYBio spaces:** DIYBio spaces are a network of local community labs that provide opportunities and training for citizen scientists, do-it-yourself biologists and engineers, makers, and biohackers: <http://diybio.org/local/>

HOW TO FIND A SCIENTIST IN YOUR AREA *continued*

- **Industry representatives:**

- The Wilson Center has created an interactive map showing both public and private synthetic biology labs: <http://www.synbioproject.org/sbmap/>
- Synberc is a multi-university research center established in 2006 with a grant from the National Science Foundation (NSF) to help lay the foundation for synthetic biology. Synberc's member companies come from all sectors of the biotechnology industry and range from startup to large multinational in size:
<http://www.synberc.org/industry/members>

REGIONAL HUB LEADERS

Building with Biology regional hub leaders will be able to help connect you with a scientist in your area; please contact the hub leader in your region to discuss your needs.

NORTHEAST

Ali Jackson, Sciencenter, Ithaca, NY
ajackson@sciencenter.org, 607-272-0600

- Northeast: NY, VT, NH, ME, RI, CT, and MA
- Mid-Atlantic: PA, NJ, MD, DC, DE, OH, and WV

SOUTHEAST

Brad Herring, Museum of Life and Science, Durham, NC
bradh@ncmls.org, 919-220-5429x360

- Southeast: VA, NC, SC, KY, TN, LA, MS, AL, GA, FL, and Puerto Rico
- South: TX, AR, and OK

WEST

Frank Kusiak, Lawrence Hall of Science, Berkeley, CA
frank_kusiak@berkeley.edu, 510-642-3224

- Southwest: CA, NV, AZ, and HI
- West: AK, WA, OR, ID, MT, WY, CO, UT, and NM

MIDWEST

Christina Akers, Science Museum of Minnesota, St. Paul, MN
cleavell@smm.org, 651-221-9434

- Midwest: ND, SD, NE, KS, MN, IA, MO, WI, IL, MI, and IN

HOW TO FIND ADDITIONAL VOLUNTEERS

In addition to finding a synthetic biologist, you may to recruit other volunteers to help with your event. Potential sources of volunteers may include

- College students, classes, or clubs with community service requirements
- High school science clubs, or students suggested by local high school science teachers
- Local chapters of professional science and engineering groups that are often associated with local colleges, such as:
 - American Indian Science and Engineering Society: www.aises.org
 - American Chemical Society (ACS): www.acs.org
 - Materials Research Society (MRS): www.mrs.org
 - National Action Council for Minorities in Engineering: www.nacme.org
 - National Society of Black Engineers (NSBE): www.nsbe.org
 - National Organization of Gay and Lesbian Scientists and Technical Professionals: www.noglstp.org
 - Society for Advancement of Chicanos and Native Americans in Science (SACNAS): www.sacnas.org
 - Society of Asian Scientists and Engineers: www.saseconnect.org
 - The Society of Mexican American Engineers and Scientists: www.maes-natl.org
 - Society of Hispanic Professional Engineers: www.shpe.org
 - Society of Women Engineers (SWE): www.swe.org
- Drama and theater students
- Local industry staff and retirees