



FEBRUARY BREAK WORKSHOP: SynBIO: Fiction vs Reality

Synthetic biology is an emerging field that fuses life science with engineering and design. But what does synthetic biology look like in our day-to-day lives? How does it differ from what we see in movies or in fiction novels? To help answer these questions, the BioBuilder Educational Foundation will run a 3-day hands-on synthetic biology experience at our recently opened Learning Lab. Working along a trained scientist, students will explore the ideas in the first Young Adult book about Synthetic Biology ("Right of Capture" by Isadora Deese) while also doing lab activities that focus on adapting and engineering living systems. By the end of the program, students will have a firm grasp of what synthetic biology is and some tools to help them distinguish science fiction from real scientific possibilities.

Age Group: 10-14 years old

Date: Feb 20th-22nd, 2018; 9 am - 3 pm

Background: Some understanding of cells and cell function. Knowledge that DNA is the coding language of cells. Some familiarity with a laboratory environment is helpful, but not required.

Location: Learning Lab at Lab Central (700 Main St Cambridge MA 02139)

Registration Fee: \$600 per participant; Minimum of 10 students required.

- Participants will need to provide their own nut-free lunches.

Registration: <http://bit.ly/2mbaTA6>

Have a question? Please contact us at info@biobuilder.org

Day 1 (Feb 20th):

In this lab, students will use *E. coli* that has a banana smell sensor used to determine how it is growing. Lab will focus on how we could design and use sensors to tackle every day and global problems

Day 2 (Feb 21st):

In this lab, students will focus on the biological pathways used by *E. coli* to create pigments, understanding how different genetic components are needed for different outputs. Students will also learn about biological chassis and be encouraged to brainstorm ways to modify existing genetic circuits for future use.

Day 3 (Feb 22nd):

In this lab, students will learn how synthetic biologists can combine different genetic parts to generate a desired product and learn about observed vs predicted outcomes. Lab will end with an exercise in design, thinking about how to utilize these tools and concepts to address problems impacting our world.

▫ **What does a typical day look like?**

9:00am – 9:15am Drop-off and warm up activities.

9:15am – 10:00am Group Discussion: We set up the schedule for the day and ease into the first lab activity.

10:00am – 11:30 am Lab activity. Students will get into the lab and prepare lab or perform experiment using the investigative tools needed for their activity.

11:30 am – 12:30 pm Book club discussion about chapters assigned from “Right of Capture.” Staff will lead discussion comparing the experiment with the story.

12:30pm – 1:15pm Lunch time. Chance for students to eat, stretch their legs and unwind. Time may include videos from Mythbusters, PBS Nova, or KQED.

1:15pm – 2:30pm Additional time in the lab. Students will complete the experiment for the day, using the tools learned in the morning session to gather data about a synthetic living system.

2:30pm – 3:00pm Afternoon Snack and wrap up. Students will analyze data and talk what they learned. Also a good time for answering questions and sharing thoughts.