



Bioengineering Summer Camp 2019 Agenda & Topics

Day 1- Monday, 29 July

9:00-9:30	Introductions, Glossary, Lab Notebooks, Water Bottles, Intro. Survey
9:30-9:45	Safety Briefing & Pipetting Overview
9:45-10:00	iGEM Team Presentation- Who are we? What are we doing? <i>How Synthetic Bio can help the environment.</i>
10:00-10:20	Icebreaker Activity with iGEM team- Chair Game
10:20-10:30	<i>BREAK</i>
10:30-11:00	Guest Speaker - Dr. David Hirschberg - "Wearable Technology and the future of Synthetic Biology"
11:00-11:20	Lecture: DNA, RNA, & Proteins
11:20-12:00	Practice Loading Gel Boxes in the lab (4 groups)
12:00-12:45	<i>LUNCH</i> <i>Candy DNA Models</i>
12:45-1:45	Lab #1: Crime Scene Simulation w/ Gel Electrophoresis
1:45-2:00	<i>BREAK</i>
2:00-2:45	Jeopardy Review Game
2:45-3:00	Wrap-Up
	** PRINT GELS FOR EACH GROUP



Day 2-Tuesday, 30 July

9:00-9:45	Welcome and Guest Speaker Dr. Arun Mathews- Nerdcore Learning & short creative activity “make a microbe superhero”
9:45-9:55	BREAK
9:55-10:15	Read Gel Results and Record (print out gel images for each person) have students annotate printout
10:15-10:45	Lecture: Cells- Eukaryotes and Prokaryotes
10:45-11:30	Lab #2: Using microscopes & Smartphones to look at cells Add onion cells with mitosis.
11:30 - 12:00	Lab #3: DNA Extraction Necklace
12:00-12:45	<i>LUNCH</i> <i>Science Games!</i> <i>Citizen Science Data Collection</i>
12:45-1:45	Lecture: Proteins, Pipetting Review
1:45-1:55	<i>BREAK</i>
1:55-2:50	Lab #4: Protein Concentration Pipetting Artwork
2:50-3:00	Wrap-Up
	**PRINT ABSORPTION GRAPHS



Day 3- Wednesday, 31 July

9:00-9:45	Recap: Protein Concentration Artwork – “a cautionary tale of inaccuracies” and graph a couple of data points. Print out data and standard curve.
9:45-10:00	Lecture: PCR Amplification and How it’s used in synthetic biology. PTC taste test. Guest Speaker – Dr. Jenna McKee-Johnson
10:00-11:00	Lab #5: Run PTC Polymerase Chain Reaction (Set up PCR using 2X master mix) Then place into Thermocycler for 2 hours.
11:00-11:10	<i>BREAK</i>
11:10-12:00	Pour gel
12:00-12:45	<i>LUNCH</i> <i>Work on coloring book page designs</i>
12:45-1:45	Set up digest for PCR products
1:45-1:55	<i>BREAK</i>
1:55-2:50	PTC Gel Electrophoresis
2:50-3:00	Wrap-Up



Day 4-Thursday, 1 August

9:00-9:30	PTC Gel Results- printouts of gels for each student
9:30-10:00	Lecture: Bacterial Transformations, Plasmids, GFP, and How they are used in synthetic biology.
10:00-10:45	Lab #6: Prepare Banana Bacteria Cultures (all students in micro-lab)
10:45-11:00	<i>BREAK</i>
11:00-12:00	Agar Art - (all students do this in downstairs offices or microlab)
12:00-12:35 (shorter lunch)	<i>LUNCH</i> <i>Work coloring book page designs</i>
12:35-1:10	Lab #7: Dessert - Miracle Berry Taste Testing
1:10-1:20	<i>BREAK</i>
1:20-2:20	Lab #8: Albert's Food Science Lesson
2:20-2:50	MOVIE & POPCORN - PBS Wonder "making life" clip - followed by discussion groups
2:50-3:00	Wrap-Up



Day 5- Friday, 2 August

9:00-9:15	Group Photo with Rustosaurus
9:15-9:45	Analyze Banana Bacteria Results
9:45-10:20	Guest Speaker - Jennifer Skenfield MSHS, BSN, RRT, CCRA "Clinical Research", Merck Research Laboratories
10:20-10:30	<i>BREAK</i>
10:30-11:00	Guest Speaker – Dr. Stan Langevin, Research Scientist - Gut Microbiome & Our Health
11:00-11:20	Reflection Prep Draw a picture/poster that reflects something you learned or found interesting or write a letter or speech about the camp and your experience.
11:20-12:00	Bioethics - How synthetic biology is changing how we think about genetics?
12:00-12:45	<i>LUNCH</i>
12:45-1:15	Imagine the future! Take a few minutes to discuss in groups and then draw a picture or write a paragraph about where you think synthetic biology could take us. How might it affect medicine, the environment, or data storage.
1:15-1:45	Exit Survey
1:45-2:45 <i>refreshments (blue tea, lemonade, frozen grapes, miracle berry tablets)</i>	Bioengineering Reception! -Summary of camp time spent -Student Reflection Presentations "What We Learned & Areas I'm Inspired to Learn More About" -Certificates to Campers
2:45-3:00	Final Wrap-Up