

Syllabus for Community Science Academy 2

Held at Caltech from June 19 to July 28, 10 am to 3:30 pm, Mon/Wed/Fridays

Week 1: Environmental monitoring

Monday, June 19		
10:00 am – 11:30 am	Library	Computing basics: following directions
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Computing basics: a simple C program
2:00 pm – 3:30 pm	Library	Computing basics: more on printing

Wednesday, June 21		
10:00 am – 11:30 am	Library	Doing math: data types
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Humanities 1: writing polite emails
2:00 pm – 3:30 pm	Library	Doing math: variables

Friday, June 23		
10:00 am – 11:30 am	Library	Controlling program flow: conditional expressions
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Controlling program flow: loops
2:00 pm – 3:30 pm	Library	Hack-a-thon: interactive graphics program

Week 2: Environmental monitoring (continued)

Monday, June 26		
10:00 am – 11:30 am	Library	Hack-a-thon: interactive graphics program
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Humanities 2: Improvisational comedy
2:00 pm – 3:30 pm	Library	Introduction to electronic circuits

Wednesday, June 28		
10:00 am – 11:30 am	Library	Building electronic circuits
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Introduction to microcontrollers
2:00 pm – 3:30 pm	Library	Creating microcontroller projects

Friday, June 30		
10:00 am – 11:30 am	Library	Introduction to sensors; planning time
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Environmental monitoring building
2:00 pm – 3:30 pm	Library	Testing and result write-up

Week 3: Remote sensing

Monday, July 3		
10:00 am – 11:30 am	Library	Simple model of fluid drag
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Laminar versus turbulent flow
2:00 pm – 3:30 pm	Library	How wings work + virtual wind tunnel

Wednesday, July 5		
10:00 am – 11:30 am	Library	Lab tour (TBD)
11:30 am – 12:30 pm	Library	Lunch
12:30 pm – 2:00 pm	Library	Build a wing and measure its lift
2:00 pm – 3:30 pm	BI lawn	Build and fly a kite

Friday, July 7		
10:00 am – 11:30 am	Brennen	Humanities 3: writing scientific abstracts
11:30 am – 12:30 pm	Brennen	Lunch
12:30 pm – 3:30 pm	Brennen	Design and build a remote controlled (RC) kite

Week 4: Remote sensing (continued)

Tuesday, July 10		
10:00 am – 11:30 am	Huntington	Revise and fly an RC kite
11:30 am – 12:30 pm	Huntington	Lunch
12:30 pm – 2:00 pm	Huntington	Revise and fly an RC kite
2:00 pm – 3:30 pm	Huntington	Revise and fly an RC kite

Wednesday, July 12		
10:00 am – 11:30 am	Huntington	Revise and fly an RC kite (add servos/camera/GPS)
11:30 am – 12:30 pm	Huntington	Lunch
12:30 pm – 2:00 pm	Huntington	Revise and fly an RC kite (add servos/camera/GPS)
2:00 pm – 3:30 pm	Huntington	Write up SKIES flight presentation

Friday, July 14 (Career Day)		
10:00 am – 11:30 am	Library	Career seminar (joint with SRC)
11:30 am – 12:30 pm	Library	Lunch + flight presentations
12:30 pm – 3:30 pm	Library	Humanities 4: presidential debate

Week 5: Bacterial detection

Monday, July 17		
10:00 am – 11:30 am	Biolab	Safety lecture @ Biomolecular lab – closed-toed shoes, long pants, no contact lenses, hair up! Pouring LB plates. (TAs need to make LB agar solution in advance)
11:30 am – 12:30 pm	Courtyard	Lunch
12:30 pm – 2 pm	Biolab	Collection and culturing of bacterial samples
2 pm – 3:30 pm	CTLO	Prokaryotes vs eukaryotes: making bread

Wednesday, July 19		
10:00 am – 11:15 am	Biolab	Isolating single colonies
11:30 am – 12:30 am	Noyes	Lunch & Caltech faculty seminar with Prof. Reisman (joint with SRC)
12:45 pm – 1:30 pm	Biolab	Lab tour (Bois) – termites!
1:30 pm – 3:30 pm	Biolab	Microscopy using 3D microscope.

Friday, July 21		
10:00 am – 11:00 am	Biolab	Propagating to liquid and EMB plates
11:00 am – noon	Biolab	Lesson on bacterial metabolism
12:15 am – 1:15 pm	CTLO	Lunch
1:30 pm – 2:30 pm	Biolab	Making yogurt
2:30 pm – 3:30 pm	CTLO	Microscopy using 3D microscope

Week 6: Bacterial detection (continued)

Monday, July 24		
10:00 am – 11:30 am	Biolab	Biochemical testing of bacteria using API test kits
11:30 am – 12:30 pm	Courtyard	Lunch
12:30 pm – 1:30 pm	Biolab	Lesson on polymerase chain reaction
1:30 pm – 3:30 pm	Biolab	DNA extraction + polymerase chain reaction

Tuesday, July 25		
1 pm – 5 pm	Biolab	Free lab day

Wednesday, July 26		
10:00 am – noon	Biolab	Humanities 5: threshold crossing
Noon – 1 pm	Biolab	Lunch (<i>instructors present</i>)
1 pm – 3:30 pm	Biolab	Gel electrophoresis + submission for sequencing

Friday, July 28		
10:00 am – 11:30 am	Biolab	Analysis of API test kit results; review of sequencing results + BLAST search.
11:30 am – 12:30 pm	Biolab	Lunch (<i>students present</i>)
12:30 pm – 2:00 pm	Biolab	Continue biochemical and genetic analysis. Write up of bacterial results.
2:00 pm – 3:30 pm	CTLO	Final wrap-up and graduation