

# Nano Summer Camp Outline (Example)

Time	Monday	Tuesday	Wednesday	Thursday	Friday
Big Ideas covered	<p>Size and Scale</p> <p>Dominant Forces change with scale</p> <p>Where do we see it: The most efficient lab ever: NATURE</p> <p>Bio-mimetics</p> <p>Interdisciplinary Nature of Nanoscience.</p>	<p>Intro to lithography</p> <p>Gecko foot model</p> <p>TOP-Down</p> <p>Construction of materials</p> <p>Competing forces-with reference to gecko climbing</p> <p>Bottom-Up construction of materials</p>	<p>Tools and Imaging in the LAB, Lab tours</p> <p>--EM lab</p> <p>--Yang lab</p> <p>--Fearing Lab</p> <p>Nano in Everyday life: Solar Cells</p>	<p>Nano in Everyday life: LiquidCrystals</p> <p>Tools: AFM</p> <p>LBNL Tour</p>	<p>Nano and the Society: Societal and ethical Implications Forum</p> <p>Family, faculty and staff open house/poster session</p>
10-11	<p>Introduction and Camp Schedule</p> <p><b>Image sorter Game</b></p> <p>Talk about using lab notebook</p> <p>What is Nano?</p> <p>Why is nano special?</p> <p>Why is it happening now?</p> <p>How long has it been around and in what ways?</p> <p>Where do we see it: start into to Nano in Nature</p> <p>Start the question board. (<b>ends by 10:45 AM</b>)</p> <p>Size and Scale Activity</p>	<p>Continue discussion on Gecko Foot</p> <p>Glue, suction etc</p> <p>Brief discussion on math equation in a discussion format</p> <p>Show images</p> <p>Start the foot molding or soft lithography process</p>	<p>Intro to Lab tour</p> <p>Lab tours</p> <p>Electron Microscopy Lab (20 min)</p> <p>Fearing (Gecko and Robotics ) Lab (10 min)</p> <p>Piedong Yang (Nanotubes and Nanosturctures) Lab (20 min)</p>	<p>Nano in everyday life:</p> <p>Liquid Crystals</p> <p>Can use example of magnets to explain self assembly, and changes to ordering when one magnet is affected. This is similar to LC ordering.</p> <p>Tools for imaging and manipulation: The AFM and the SPM</p>	<p><b>Wrap up for lbl tour</b></p> <p>Discussion group: nano and the society</p> <p>Ideas: Role playing, specific situations, nano silver socks and dietary supplement with nano particles. Ethical issues of using butterfly, gecko, cancer treatment etc.</p>

11-12	<p>Properties that change with size: clay ball activity, changes in shape of water droplet, tiny tea cup (ends by 11:15 AM)</p> <p>Nasturtium, self cleaning --Water droplet on leaf demo,</p> <p>Why is the lotus effect important (20 min total)</p> <p>Observe with microscope, only demo ---Lab Safety Video (15 min)</p>	<p>Intro to Nanotubes and Nanowires And Quantum dots: quick talk about QD, no demo</p> <p>Applications of NT and NW</p> <p>Balloon activity: Structure of a nanotube</p> <p>Grad student presentation on Nanostructures</p>	Lab tours contd		<p>Discussion group: nano and the society</p> <p>contd</p>
1-2	<p>Super-hydrphobic surfaces Lab magic sand (30 Min)</p>	<p>Types of Lithography</p> <p>Bottom up and top down approach</p>	Solar Cells	LBNL Tour	<p>Students work on their presentations</p>
2-3	<p>Presentation Babek Sanai (LBL) on Photonic crystals in Nature</p> <p>BACKGROUND: Light , Energy, Wavelength, frequency,</p>	<p>E beam lithography and its importance in computing</p> <p>--start lab</p> <p>Continue photolithography lab</p> <p>Photolithography</p>	<p>Gecko foot tape testing and measurements</p> <p>LEGO setup</p>	LBNL Tour	<p>Student presentation and student families</p> <p>Coffee and snacks provided</p>

---

Interference effects

The Butterfly  
Wing: colors  
-Structure Vs  
Pigments  
-Wing activity with acetone  
-Optical microscope  
-Discuss SEM images of the wings

3-4

Start discussion on the gecko foot  
--See the gecko  
Sticky tape activity

**Wrap up on the day, focus on what stood out for the students get feedback, what they thought was cool**

Photolithography contd

**Wrap up for the day**

The afternoon will be split between studying the Gecko foot and the Solar Cells Activity

**Wrap up for the day review lab tours**

Finish LBNL Tour and return to lab

**Wrap up.**

Student presentation with student families

Coffee and snacks provided

Wrap-Up

---