

SciVentures: Journey Inside the Cell

July 14-18 and July 21- 25, 2014
University of North Carolina-Chapel Hill
Chapel Hill, NC



UNC
MOREHEAD PLANETARIUM
AND SCIENCE CENTER



Presented by the **MOREHEAD PLANETARIUM
AND SCIENCE CENTER**
with the **UNC CENTER FOR ENVIRONMENTAL HEALTH AND SUSCEPTIBILITY**

In "Journey Inside the Cell," campers explore the hidden lives of cells through hands-on learning experiences. Examine your cheek cells, extract your own DNA and go on lab tours to meet with scientists conducting cutting-edge research. Combining artistic flair and scientific discovery, this program gives learners a variety of ways to understand and explore cells and a greater awareness of how today's scientists are studying cells to promote health and fight disease.

Day 1: Modeling Cells and Organelles

9:00AM **Welcome and Introductions**

9:50AM **What is Life?**

As a group, we will spend time discussing how to tell whether something is living or non-living and describing the properties of all cells and the organization of cells in multicellular organisms.

10:50AM **Cell Cities**

We will discuss how cells include organelles, each of which plays a particular role in allowing the cell to stay healthy and active, and will compare cells to cities made up of many different parts by constructing models of organelles for a "cell city."

12:00PM **Lunch**

1:00PM **3D Cell Models , Part I**

Once we have gained a better understanding of a cell's structure, campers will get a chance to exercise their knowledge by making 3D cell models using ice (week 1) or clay (week 2).

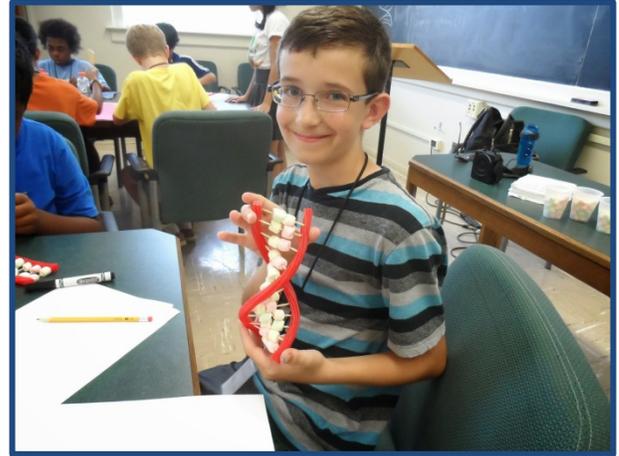
1:45PM **Bubble Cell Membranes**

The group will learn about a very crucial component of the cell, the plasma membrane, using a bubble solution to model the semi-permeable nature of the membrane..

2:45PM

Have Your DNA and Eat It Too

Now that we understand that our bodies are made up of cells, we will discuss how information inside those cells makes us who we are and different from each other. Genes are portions of DNA, which is inside the nuclei of our cells and code for certain traits. We will discuss different ways our genes can produce certain traits, such as hair color or height, and build edible models to better understand the 3D structure of DNA.



3:20PM

Blog Setup and Posting

3:50PM

Daily Wrap Up and Departure

Day 2: Peering Into Cells

9:00AM

Introduction and Warm-Up Game

9:30AM

3D Cell Models, Part II

Students will finish decorating and present their cell models to the group.

10:00AM

Field Trip: Biophysics of cells

Students will tour the lab of Physics professor, Rich Superfine, to learn how biologists, physicists, and computer scientists work together to understand the role forces play in the structural integrity, function and response of cells to their environment.

10:45AM

Cheek and Onion Cell Microscopy

To compare the differences between plant and animal cells, we will all examine our own cheek cells and then onion cells under a microscope.

11:45AM

Lunch

12:45PM

Field Trip: Microscopy Lab

We will take a field trip to UNC's Microscopy facilities in the Brinkhous-Bullitt building of the UNC School of Medicine, where students will be shown the different types of electron microscopes scientists can use in their research.

2:35PM

Extract Your Own DNA

DNA is something that can actually be removed from the nucleus and observed with the naked eye using a simple process. Each participant will extract and observe DNA from their cheek cells.



3:20PM

Blog Posting

3:50PM Daily Wrap Up and Departure

Day 3: Introduction to Cells and Disease

9:00AM Introduction and Depart for UNC School of Medicine Lab Demonstrations

9:30AM Scientist talk: Cell Division

Amy Maddox, UNC Biology Department researcher, will teach us about the cytoskeleton—the network of intracellular proteins that provide the cell shape, support, and enable movement and cell division.

10:45AM Field Trip: Cytopathology Lab

During this trip to McLendon Clinical Laboratories at UNC Hospitals Dr. Leslie Dodd, director of the cytopathology laboratories on campus, will show us images of diseased cells and let us use a multi-head microscope.

12:00PM Lunch

1:00PM Field Trip: Apoptosis and Stem Cells

We will meet with Dr. Raluca Dumitru and Dr. Mohanish Desmukh. Dr. Desmukh and his lab team will teach us about apoptosis – programmed cell death – and how it relates to development and disease, while Dr. Dumitru will give us a tour of her lab where we will be able to observe stem cells.

2:20PM Return to Classroom

3:20PM Blog Posting

3:50PM Daily Wrap Up and Departure

Day 4: Cells, Lifestyle and Environment

9:00AM Introduction to Cancer Cells

We will begin our investigation into the interaction between cells and the environment with a brief discussion about the cellular origins of cancer.

9:30AM M&M Cell Division

We will demonstrate what the process of excessive cell division looks like, and how it increases the number of cells at an exponential rate, by using M&Ms.

10:00AM Depart for UNC Gillings School of Public Health

10:30AM Field Trip: Cell Communication and Disease Risk

Students will meet with Dr. Melissa Troester, who studies breast cancer and the way cancer cells communicate, and with Dr. Liza Makoswki, who also studies breast cancer but focuses more on obesity as a factor that can lead to the development of cancer. Students will build models to better understand how cells communicate and to understand the role of the extracellular environment in the promotion of disease.

12:00PM Lunch

1:00PM

Field Trip: Smog Chamber with Kenneth Sexton

Campers will meet with another Public Health scientist, Dr. Kenneth Sexton, who examines the effects of smog and air pollution on our wellbeing. Dr. Sexton will also give us a tour of UNC's Smog Chamber, where much of this research takes place.



2:15PM

Return to Classroom

2:45PM

Lipid Membranes

Before breaking for the day, we will briefly return to the concept of a cell membrane and will demonstrate another aspect of its structure and properties using vinyl gloves, Crisco, and a bowl of ice water.

3:15PM

Blog Posting

3:50PM

Daily Wrap Up and Departure

Day 5: Cells Alive!

9:00AM

Introduction and Depart to Lineberger Cancer Center

9:30AM

Field Trip: Understanding Skin Cancer

Campers will tour the labs of Dr. Kaufman and Dr. Bear to learn more about the cellular origins of cancer. In each lab, scientists will show how they use state-of-the-art technology and computer models to examine damaged chromosomes in potentially cancerous cells and to better understand cell motility in the development of cancer.

11:30AM

Return to Classroom

12:00PM

Lunch

1:00PM

Cell Art Activity

As the culmination of our week together, you are going to make an art project inspired by cells. As we have seen this week, there are a number of different artistic media to demonstrate cell life. You will now work individually or in groups to produce and present an artistic representation of what they learned such as a 3D sculpture, poem or skit.

3:35PM

Blog Posting

3:45PM

Closing Wrap Up and Departure

