



REGENERON DNA LEARNING CENTER MIDDLE SCHOOL STUDENT PROGRAMS

The DNA Learning Center (DNALC) is the world's first museum devoted to genetics education for the public. The *Regeneron DNALC*, as a collaboration of Cold Spring Harbor Laboratory and Regeneron Pharmaceuticals, Inc., brings the same lab field trip opportunities that have been offered in Cold Spring Harbor for the past 30 years to Westchester County. Our programs include a variety of hands-on laboratories to introduce elementary and middle school students to the wonderful world of molecular biology.

SUGGESTED FOR GRADES 5 & UP

Baggie Cell Model (1 hour)

Learn about the structure and function of the cell and make a cell model.

Diversity of Life (1 or 2 hours)

Investigate taxonomy using compound microscopes

DNA Models (1 hour)

Learn about the genetic code and make a 3-D model of the double helix. (\$4 materials fee per student)

Mutant Organisms (1 hour)

Discuss the impact of genetic mutations and observe mutations in fruit flies and/or nematodes using stereomicroscopes.

Mendelian Inheritance (1 hour)

Use corn as a model to investigate the laws of inheritance.

DNA Extraction

(1 hour)

Extract DNA from plant cells using household ingredients.



SUGGESTED FOR GRADES 6 & UP

Molecular Models and Bubbling Liver (1 hour)

Observe the metabolic enzyme catalase as it reacts with hydrogen peroxide and learn about the factors that affect enzyme activity.

Enzymatic Food Production

(1 hour)

Use enzymes to make cheese and apple juice.

Better Milk for Cats (1 hour)

Build a bioreactor to convert regular milk into lactose free milk.

Bacteria and Antibiotics (1 hour)

Observe the effect of antibiotics on bacteria.

Antibiotic Resistant Bacteria

(1 or 2 hours)

Genetically engineer bacteria to become antibiotic resistant.

Viral Infection (1 hour)

Infect bacteria with a virus and observe the result.

Glowing Genes (1 or 2 hours)

Genetically engineer bacteria with the GFP (Green Fluorescent Protein) gene for bioluminescence.

SUGGESTED FOR GRADE 8

Glowing Genes (1 or 2 hours)

Genetically engineer bacteria with the GFP (Green Fluorescent Protein) gene for bioluminescence.

Protein Purification (2 hours)

Collect and purify green fluorescent protein from glowing bacteria.

DNA Fingerprint (2 hours)

Use gel electrophoresis to analyze and compare "evidence" DNA to "suspects."

Gene Therapy (1 or 2 hours)

Genetically engineer "lactose intolerant" bacteria to become "lactose tolerant."

FORENSICS LABS FOR ALL GRADES

The Mystery of Anastasia

(1 hour, computer)

Use forensic techniques to identify the remains of the Russian royal family, and the missing princess Anastasia Romanov.

Pollen Tells a Story (1 hour)

Investigate the mystery surrounding the last few days of Ötzi the Iceman's life through the microscopic analysis of pollen.



EXTENDED DAY FIELD TRIPS:

CSI: Learning Center

Grades 6–8

9:30–11:30 DNA Extraction
& Mystery of Anastasia

11:30–12:00 Lunch

12:00–2:00 DNA Fingerprint

Survival of the Fittest

Grades 5–8

9:30–11:30 DNA Extraction & Mutant Organisms

11:30–12:00 Lunch

12:00–2:00 Bacteria and Antibiotics
& Better Milk for Cats

DNA Basics

Grades 5–8

9:30–11:30 Mendelian Inheritance & DNA Models

11:30–12:00 Lunch

12:00–2:00 Chromosome Splats (prepare and view
human chromosomes with microscopes) &
DNA Extraction

You Choose the Labs!

Grades 5–8

Choose four 1-hour labs for a customized full day
experience.

TWO HOUR LAB FIELD TRIP OPTIONS:

- One 2-hour laboratory experience, such as *Glowing Genes* or *DNA Fingerprint*.

OR

- Two 1-hour laboratory experiences, such as *DNA Models* and *DNA Extraction*, or *DNA extraction* and *The Mystery of Anastasia*.



RESERVATION DETAILS

- *Regeneron DNALC* classrooms are limited to 32 students and are reserved on a first come, first served basis.
- For most field trips we can accommodate two classes at the same time (9:30–11:30 am, 12:00–2:00 pm, or 9:30–2:30 pm).
- Lunchroom must be reserved in advance; bag lunches only (no vending machines).
- Two-hour field trips are \$400/class.
- Extended day field trips are \$750/class.
- Reserve by phone.

For reservations, contact: Mary Lamont at **516-719-1296**