

MIDDLE SCHOOL PROGRAMS

The DNA Learning Center is the world's first science center devoted to genetics education for the public. It is an operating unit of the Cold Spring Harbor Laboratory, a world-renowned genetics research institution. Our instructional programs include a variety of hands-on laboratories to introduce elementary and middle school students to the wonderful world of molecular biology. Schedule a field trip at a DNA Learning Center location, in-school, or virtually.

GRADES 5–8

Our Human Inheritance (1 hour, guided museum tour)

Explore our exhibition, which features an exact replica of a 5,300-year-old man found frozen in the Ötztal Alps in 1991—Ötzi the Iceman. *Offered only at CSH DNALC location.*

DNA Extraction from Wheat Germ (1 hour)

Wheat was one of the first crops humans domesticated. Use household materials to extract DNA from wheat germ.

Pollen Tells a Story (1 hour)

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

Ötzi FURensics (1 hour)

Use microscopes to identify which materials the Iceman sourced for his Neolithic wardrobe and toolkit.

The Mystery of Anastasia (1 hour, computer lab)

Use forensic techniques to identify the remains of the Russian royal family and missing princess Anastasia Romanov. *Not available at Harlem DNA Lab.*

Forensic Fingerprint Analysis

Two options:

Loops, Whorls, and Arches (1 hour)

Learn about fingerprint collection, differentiation, and analysis.

Dust Away Crime (2 hours)

Loops, Whorls, and Arches activities plus lift and analyze fingerprints to help solve a "mystery".



Grades 5 & 6

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. (\$5.00 materials fee per student)

Mendelian Inheritance (1 hour)

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

Observing Mutant Organisms

(1 hour)

Observe mutations in fruit flies and/or nematodes using stereo-microscopes.

Grades 6 & up

Bacteria and Antibiotics (1 hour)

Observe the effect of antibiotics on bacteria.

Better Milk for Cats (1 hour)

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

Enzymatic Food Production

(1 hour)

Use enzymes to make cheese and apple juice.

Glowing Genes (1 or 2 hours)

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

RNA Transcription (1 hour)

Learn about RNA transcription and translation and build a 2-D model illustrating these two important steps used by cells during protein production.

Bubbling Liver or **Potatoes** (1 hour)

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

Viral Infection (1 hour)

Infect bacteria with a virus and observe the result.

Grades 7 & up

DNA Fingerprint (1 or 2 hours)

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

Gene Therapy (1 or 2 hours)

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

Protein Purification (2 hours)

Collect and purify green fluorescent protein from glowing bacteria.

EXTENDED DAY FIELD TRIPS:

CSI: Learning Center \$800 per class

Grades 6–8
9:30–11:30 *DNA Extraction & Mystery of Anastasia*
11:30–12:00 Lunch
12:00–2:00 *DNA Fingerprint*
OR
Dust Away Crime

Survival of the Fittest \$800 per class

Grades 6–8
9:30–11:30 Exhibit Tour or *Bacteria and Antibiotics & Mutant Organisms*
11:30–12:00 Lunch
12:00–2:00 *DNA Extraction & Better Milk for Cats*

DNA Basics \$800 per class*

Grades 5–7
9:30–11:30 *Diversity of Life* (plant and animal cells) & *DNA Models*
11:30–12:00 Lunch
12:00–2:00 *DNA Extraction & Mendelian Inheritance*

*Plus \$5.00 materials fee per student for *DNA Models*

Ötzi the Iceman (CSH & NYC location only) \$800 per class

Grades 5–8
9:30–11:30 Exhibit Tour & Laboratory⁺
11:30–12:00 Lunch
12:00–2:00 Two Laboratories⁺

⁺ Choose from: *Pollen Tells a Story*, *DNA Extraction*, *Better Milk for Cats*, *Ötzi FURensics*

Two-hour field trip options can include any of the following:

- 1-hour laboratory experience
- 1-hour tour of *Our Human Inheritance* exhibition
- 1-hour computer lab, *The Mystery of Anastasia*
- One 2-hour laboratory experience, such as *Glowing Genes* or *DNA Fingerprint*.
- Two 1-hour laboratory experiences, such as *DNA Models* and *DNA Extraction*.



RESERVATION DETAILS

- DNALC classrooms are limited to 24 or 32 students and are reserved on a first come, first served basis.
- For most field trips, we can accommodate at least two classes at the same time (9:30–11:30 am, 12:00–2:00 pm or 9:30–2:30 pm), with the exception of the *Harlem DNA Lab*, which is limited to one class at a time.
- Lunchroom must be reserved in advance; bag lunches only (no vending machines).
- Two-hour wet lab/museum tour trips are **\$375/class** in-person.
- Two-hour wet lab/computer lab and two-hour lab trips are **\$425/class** in-person.
- *In-school* instruction is **\$1,450/day** (up to 5 classes).
- Costs for virtual options can be found on the website below.

To make a reservation go to:

<https://dnalc.cshl.edu/programs/fieldtrips/>