



DNA LEARNING CENTER MIDDLE SCHOOL STUDENT PROGRAMS

The DNA Learning Center is the world's first science museum devoted to genetics education for the public. It is an operating unit of the Cold Spring Harbor Laboratory, a world-renowned center for genetics research. Our services 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 stereo-microscopes.

Mendelian Inheritance (1 hour)

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

DNA Extraction from Wheat Germ (1 hour)

Wheat was one of the first crops humans domesticated. Learn how to extract DNA from wheat germ.



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."

SUGGESTED 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.

Our Human Inheritance (1 hour, museum exhibition)

Explore our newly remodeled exhibition, which features an exact replica of a 5,300 year-old man found frozen in the Ötztal Alps in 1991—Ötzi the Iceman.

Pollen Tells a Story (1 hour)

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

Being Human (2 hours)

Tour the Ötzi and ancient human replicas in our museum, then explore the fossil record to investigate evolutionary relationships.



Cold Spring Harbor Laboratory

DNA LEARNING CENTER

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Classes are also invited to visit our facility for field trips. Any of the above labs can be chosen for trips and can be paired with an exhibit tour or computer lab.

EXTENDED DAY FIELD TRIPS:

CSI: Learning Center \$750 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

Survival of the Fittest \$750 per class

Grades 5–8

9:30–11:30 Exhibit Tour & Mutant Organisms

11:30–12:00 Lunch

12:00–2:00 DNA Extraction &
Better Milk for Cats

DNA Basics \$750 per class

Grades 5–7

9:30–11:30 Exhibit Tour & DNA Models

11:30–12:00 Lunch

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

Ötzi the Iceman \$750 per class

Grades 5–8

9:30–11:30 Exhibit Tour & Pollen Tells a Story

11:30–12:00 Lunch

12:00–2:00 DNA Extraction from Wheat Germ &
Better Milk for Cats

Two-hour field trip options include:

- 1-hour laboratory experience
- and**
- 1-hour tour of *Our Human Inheritance*
- or**
- 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 two classes at the same time (9:30–11:30 am or 12:00–2:00 pm).
- Lunchroom must be reserved in advance; bag lunches only (no vending machines).
- Two-hour wet lab/museum tour trips are \$350/class.
- Two-hour wet lab/computer lab and two-hour lab trips are \$400/class.
- In-school instruction is \$1,375/day (up to 5 classes).
- Reserve in-school instruction and field trips by email.

Contact: C. Erin McKechnie at dnalc-ms@csHL.edu