

# Teacher Resources for the MIT Edgerton Center DNA and Protein Sets

## 1. Teacher Guides and Essential Support Materials

### **MIT Edgerton Center DNA and Protein Curriculum:**

<https://edgerton.mit.edu/DNA-proteins-sets>

This website contains our DNA and Protein curriculum, including:

- Ordering information
- Teacher guides
- Power Point presentations for leading the class
- Links to videos and related lessons

### **MIT Edgerton Center DNA and Protein Videos:**

<https://www.youtube.com/playlist?list=PLMvYhn9sjfL7YXxpN-6ImvzZuWUS7Fdlk>

These videos (under 4 min each) demonstrate the major activities in our curriculum booklets.

Protein Videos	Protein Booklet 1	DNA Videos	DNA Booklet 1
Introduction to Proteins	pages 3-9	Introduction to Nucleotides	pages 3-5
Protein Folding in Water	pages 11-12	Building a DNA Double Helix	pages 7-9
How Cells Make New Proteins	pages 13-18	Replication	pages 10-13
Introduction to Channel Proteins	page 19	Decoding a Gene	pages 15, 18-19, 21
How to Fold a Helix	pages 20-23	Transcription	pages 24-25

### **How Mutations Can Be Produced By DNA Damage:**

[http://edgerton.mit.edu/sites/default/files/media/Intro-to-Glycosylases-KMV-teacher-notes-6-10\\_0\\_0.ppt](http://edgerton.mit.edu/sites/default/files/media/Intro-to-Glycosylases-KMV-teacher-notes-6-10_0_0.ppt)

This Power Point presentation, created by Dr. Lourdes Aleman, on DNA damage, mutations, and repair is an excellent addition to our DNA Booklet 2 section, “Part II: Replication, Damage, and Repair” (pp. 10-34). This presentation is also suggested as an introduction to DNA Damage and Repair before students work with Star BioChem software (see below).

### **Watch Students and Teachers Using the Models:**

<https://www.youtube.com/watch?v=Mv0ldAHQRAI&>

This introductory video shows students and adults modeling DNA structure, replication, repair, polymerase chain reaction (PCR), transcription, and translation; as well as protein structure and protein folding with the MIT prototype models. Notice how the teacher keeps the class together, working on one activity in booklet at a time and summarizing afterwards.

## **2. Online Activities For DNA And Proteins**

### **Cell Process Animations from DNA Interactive:**

<http://www.dnai.org/a/index.html>

This website by Cold Spring Harbor has great protein synthesis animations. Look under “Copying the Code,” and “Reading the Code.” Some of the videos are more advanced than others.

### **Information on Cystic Fibrosis:**

<http://www.ygyh.org/cf/whatisit.htm>

Although not new, this website by Cold Spring Harbor focuses on the links between genes and health. Their review of the molecular basis of Cystic Fibrosis is a good companion to our Protein Booklet 1 section, “Part III: Channel Proteins” (pp. 19-28).

### **Interactive Activities on DNA, Proteins, and Sickle Cell Disease:**

<http://workbench.concord.org/database/activities/324.html>

“From DNA to Proteins and Protein Folding” is an activity that was created by the Concord Consortium as a companion to our DNA and Proteins curriculum. The colors in the animation match the colors of our models! A worksheet is provided as well.

### **Advanced 3-D Explorations of Protein Structures from the Protein Data Bank:**

<http://star.mit.edu/biochem/>

Star BioChem was developed at the MIT Office of Educational Innovation and Technology (OEIT) as a free 3-D protein viewer for advanced students and adult learners. Any protein from the RCSB Protein Data Bank can be viewed and students can explore the structure. Some worksheet guides are available for specific proteins.

