

Dynamic DNA

Grades: 6th-8th Grades

Duration: 60 minutes

Program Description

Discover what makes you different from everyone else. Students learn about genetics as they isolate their DNA and build a Watson and Crick model of DNA.

Louisiana GLE:

Grade 5-8 Science and Inquiry

- 14. Develop models to illustrate or explain conclusions reached through investigation (SI-M-A5)
- 29. Explain how technology can expand the senses and contribute to the increase and/or modification of scientific knowledge (SI-M-B3)
- 34. Recognize the importance of communication among scientists about investigations in progress and the work of others (SI-M-B5)
- 38. Explain that, through the use of scientific processes and knowledge, people can solve problems, make decisions, and form new ideas (SI-M-B6)
- 39. Identify areas in which technology has changed human lives (e.g., transportation, communication, geographic information systems, DNA fingerprinting) (SI-M-B7)
- 40. Evaluate the impact of research on scientific thought, society, and the environment (SI-M-B7)

Science

Grade 6

- 13. Use a variety of resources to identify elements and compounds in common substances (PS-M-A9)

Grade 7

- 3. Illustrate and demonstrate osmosis and diffusion in cells (LS-M-A1)
- 16. Explain why chromosomes in body cells exist in pairs (LS-M-B2)
- 17. Explain the relationship of genes to chromosomes and genotypes to phenotypes (LS-M-B2)

Key Terms:

Allele – One of a pair of genes found on a chromosome

Deoxyribose – Five carbon sugar lacking a –OH on the 2nd carbon

Gene – Code of A, T, C, G that codes for the making of a structural or functional protein

Genetics – study of the inheritance of characteristics from parent to offspring

Hydrogen Bond – Weak bond formed between molecules created by the electronegativity of the atoms

Nitrogenous Base – Substances made of one or two nitrogen carbon rings; called nitrogenous base because they have a tendency to take up H⁺ ions from a solution

Nucleotides – Molecules composed of 3 subparts used to make DNA and RNA; each contains a phosphate, 5 carbon sugar, and one of 5 nitrogenous bases

Phosphate – Polyatomic ion made of a phosphorus and 4 oxygen atoms

Protein – Structural component of cells and type of molecule that makes enzymes; polymer made of amino acids

Purine – Family of nitrogenous bases that are composed of one six member ring of N and C atoms; include thymine, cytosine, and uracil

Pyrimidine – Family of nitrogenous bases that are composed of a five member ring fused to a six member ring of N and C atoms, include guanine and adenine

Connections to Permanent Exhibits: These exhibits are found on second floor in Body Works.

Genetic Traits: This exhibit describes nine genetic traits. What form of each of these traits do you have?

Check Your Prints: Examine your fingerprints under a microscope and compare them to common forms.

DNA-The Language of Life: Where is DNA found and what shape does it have?

Web Resources:

DNA from the Beginning Cold Spring Harbor
<http://www.dnafb.org/dnafb/>

DNA from the Beginning is an animated primer on the basics of C. The science behind each concept is explained by: animation, image gallery, video interviews, problem, biographies, and links. It has 3 component parts: classical genetics, molecules of genetics, and genetic organization and control.

DNAi...Manipulation Cold Spring Harbor and Dolan DNA Learning Center
<http://www.dnai.org/b/index.html>

This would be a wonderful website to go through with your students before attending Genius of Genetics. Using tutorials with animations, interviews and videos, it discusses the manipulation and techniques of DNA technology. Especially important to understanding Genius of Genetics are the tutorials under techniques...cutting and pasting and amplifying.

DNA Workshop PBS
<http://www.pbs.org/wgbh/aso/tryit/dna/#>

Click on DNA Workshop Activity and you will get an interactive manipulative where your students can either replicate DNA Or go through the protein synthesis process. There are links on this site to information about these things and to famous people who studied DNA.

Genetics Decoding Life Museum of Science and Industry in Chicago
<http://www.msichicago.org/exhibit/genetics/index.html>

This website has Quicktime videos on Genetic Engineering, the Human Genome, Development, Cloning, and Mutations. There are also classroom activities like "Collect your own DNA," "Outbreak! Electrophoresis: Where the Bands Are," and "How Big is a Gene" to name a few.

In the Classroom Activities Index Genetic Science Learning Center at the Eccles Institute of Human Genetics University of Utah
<http://gslc.genetics.utah.edu/teachers/tindex/>

You will find these guides, as well as Print-and-Go™ activities and wet labs for the classroom. Choose a module to view the associated guides and activities including The Basics and Beyond, Introduction to Heredity (Grades 5-7), Genetic Disorder Corner, DO Try This at Home!, Gene Therapy: Molecular Bandage?, Cloning in Focus, and Stem Cells in the Spotlight. To use these you do have to register, but this allows you to receive their free newsletter.

Interactive DNA Genetic Science Learning Center at the Eccles Institute of Human Genetics University of Utah
<http://gslc.genetics.utah.edu/units/basics/builddna/>

This website has an interactive model of DNA students can build on the web. This would be a great introductory prior to coming to Sci-Port.

Putting DNA to Work Marian Koshland Science Museum of National Academy Sciences
<http://www.koshlandsciencemuseum.org/exhibitdna/index.jsp>

This website has video and animation interactives on DNA Sequence, Inherited Diseases, Improving Crops, and Infectious Diseases.

Tour of the Basics Genetic Science Learning Center at the Eccles Institute of Human Genetics University of Utah
<http://gslc.genetics.utah.edu/units/basics/tour/>

This is a tour of the basic understanding of DNA and genes. In an interactive, animation format students can explore "What is DNA?", "What is a Gene?", "What is a Chromosome?", "What is a Protein?", "What is Heredity?", and "What is a Trait?".

Pre-Visit Activities

Post-Visit Activities