

Vocabulary:

DNA: Your genetic information. Think of your DNA as a recipe instructing the cells of your body on what proteins to make. Proteins determine a lot about you. You have the color hair you have because of proteins. Your hair is straight or curly because of proteins. Your eye color? You guessed it. Proteins!

Basic Components of DNA: DNA is a double stranded molecule made of three types of compounds: a sugar, a phosphate, and a base.

Sugar Phosphate Backbone: The backbone of each strand of your DNA is made of sugars and phosphates chemically bonded to each other. The phosphates have a negative charge, resulting in the entire DNA molecule having an overall negative charge. (This fact will be important to the Crime Scene Investigation Lab)

Laws of Charges:

Opposites Attract- Something with a negative charge like DNA will be attracted to a positive charge.

Like Charges Repel- DNA with its negative charge will be pushed a way, or repelled, from a negative charge.

DNA bases: When you read a book, the order of the 26 letters of our alphabet forms words and sentences that help you understand the author's meaning. The alphabet of your DNA only has 4 letters: A, C, G, and T! These letters aren't the same as the letters of our alphabet; they are actually 4 different chemical compounds called nitrogenous bases. The order of these bases communicates to your cells what proteins need to be made. For example, AGGGGGGGCCCAAATTTAAAATTTTAAAAA may be the recipe for making one particular protein but GGGGGGGGGCCCCCCCCCAAAAA would be a totally different protein!

Remember that DNA is a double stranded molecule. Have you ever thought about what holds the two strands of DNA together? Hydrogen bonds between the bases do! Think about a magnet. What happens when you hold the two opposite poles of a magnet together? They are attracted and they stick together! That's kind of what happens with the two strands of DNA. The nucleotide bases are "attracted" to each other and form a chemical bond. These 4 different bases form chemical bonds with each other in a very specific pattern. Below are the base pairing rules

A will always pair with T (If you need an easy way to remember, think of the word "AT")

G will always pair with C (If you are a Clemson fan you can think of "Go Clemson!" If you aren't, you are on your own for this one.)

Genes: A section of the DNA that contains the information for making one particular protein. You have over 20,000 genes in just one cell!

Allele: Some genes have different versions of the gene. For example, everyone has a gene for eye color but not everyone ends up with the same color of eyes because they have different versions of the gene. These versions of the gene are referred to as alleles.

Genotype: what your genetic information says spelled out in the language of nucleotide bases. For example, the gene for a trait may read “ATTTGGGGGCCCCGGGGG” That’s the genotype.

Phenotype: the observable characteristics you have based on what your genes say. It’s the part we see. In the case of hair color, your phenotype might be blonde hair. Or maybe it’s black, or red or brown.

Did you know? 97% of the DNA in your cells is known as non-coding DNA. That means this DNA doesn’t have a recipe for which proteins should be made in your body. But that doesn’t mean it doesn’t have an important job! New research is showing that this non-coding DNA plays an important role in regulating which genes will be turned “on” or “off.” Say what? Our genes are like light switches?

Kind of!

Every cell in your body (with the exception of a few) has the same DNA. Your skin cell looks way different than a muscle cell for example because different genes are turned “on” or “off”. If a gene is turned “off” in a cell, then the protein that gene codes for won’t be made. If a gene is turned “on” in a cell, then the protein will be made!