

Name: _____

Building a Double Helix

Background/Abstract:

(Adapted from <http://www.livescience.com/37247-dna.html>)

Deoxyribonucleic acid or DNA is a molecule that contains the instructions an organism needs to develop, live and reproduce. These instructions are found inside every cell, and are passed down from parents to their children. DNA is made up of molecules called nucleotides. Each **nucleotide** contains a **phosphate group (P)**, a **sugar group (S)** and a nitrogen base. The four types of **nitrogen bases** are **adenine (A)**, **thymine (T)**, **guanine (G)** and **cytosine (C)**. The order of these bases is what determines DNA's instructions, or genetic code. Similar to the way the order of letters in the alphabet can be used to form a word, the order of nitrogen bases in a DNA sequence forms genes, which in the language of the cell, tells cells how to make proteins.

Nucleotides are attached together to form two long strands that spiral to create a structure called a **double helix**. If you think of the double helix structure as a ladder, **the phosphate and sugar molecules would be the sides, while the bases would be the rungs**. The bases on one strand pair with the bases on another strand: **adenine pairs with thymine, and guanine pairs with cytosine**.

DNA molecules are long — so long, in fact, that they can't fit into cells without the right packaging. To fit inside cells, DNA is coiled tightly to form structures we call **chromosomes**. Each chromosome contains a single DNA molecule. **Humans have 23 pairs** of chromosomes, which are found inside the cell's nucleus.

DNA sequencing is technology that allows researchers to determine the **order of bases** in a DNA sequence. The technology can be used to determine the order of bases in genes, chromosomes, or an entire genome. In 2000, researchers completed the first full sequence of the human genome.

Activity Instruction:

- Each student will need a strip of each of the “letters” (P, S, A, T, G, C)
- Each student will be assigned one of four DNA sequences to produce; be sure to record the number of your sequence in the space provided on the page to be handed in.
- Cut and paste the letters to create a completed, double stranded representation of the DNA sequence you have been assigned.

Name: _____

Building a Double Helix

DNA sequence #: _____

Building a Double Helix

Teacher's Copy

Sequence 1: AGTCTC

Sequence 2: GGTA CT

Sequence 3: TCCAGA

Sequence 4: CATTGG