

# DNA Molecule

## Assembly Instructions

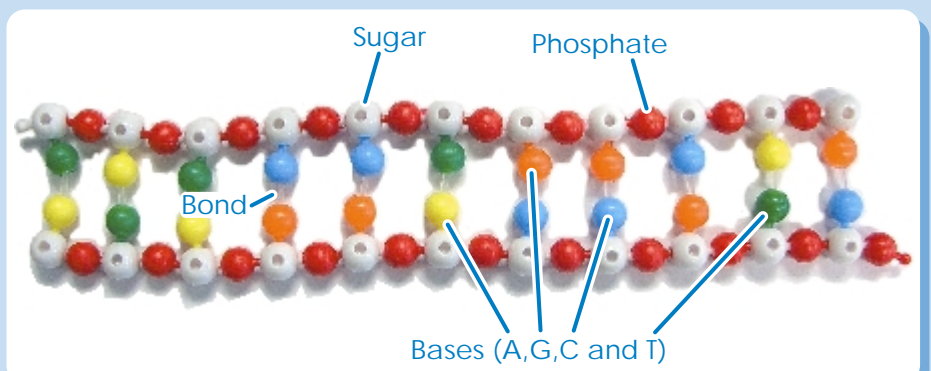
Deoxyribonucleic acid is a special molecule (or macromolecule) that we call DNA. The molecule is made up of units called nucleotides. Each nucleotide is made up of a phosphate group, a sugar (deoxyribose) and a nitrogen base. Two long chains of nucleotides are joined by a bond into a twisted ladder that is called a double helix. The phosphate and sugar form two long chains that make up the sides of the ladder. Each rung contains a pair of bases held together by hydrogen bonds. There are 4 bases: adenine (A), thymine (T), cytosine (C), and guanine (G). Bases A and T always pair together, and C and G always pair together.

### Parts Checklist

The following items are provided with the DNA Molecule & Forensics kit:

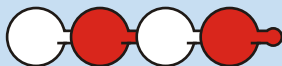
- cups (12)
- white beads
- blue beads
- green beads
- yellow beads
- orange beads
- red beads
- clear connectors

### Sample DNA Molecule

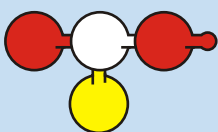


### Connecting Components

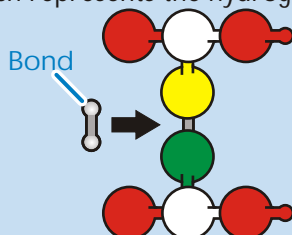
The ladder sides are formed by joining a red phosphate bead to a white sugar bead, continuing to form a chain.



The ladder rungs are formed by connecting blue, green, yellow or orange nucleotide bases to each sugar



Two ladder sides are joined at their rungs (bases) by the clear connector which represents the hydrogen bond.

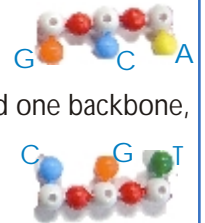


**Remember:**  
Thymine pairs with adenine.  
Guanine pairs with cytosine.

### DNA Model Components

DNA structure includes "ladder" sides that are sometimes referred to as "backbones." A ladder side becomes a complete backbone when you add a base to each of its sugars.

For the backbones, connections are made directly from bead to bead (representing covalent bonds). Once you have created one backbone, you can then create its complementary backbone using the pairing rule: A-T, T-A, G-C, C-G.



When you have assembled each of the two complementary backbones, connect them at the complementary base-pairs using the bond components or clear connectors (representing hydrogen bonds).



The list at right identifies the DNA model components.

Component Color	DNA Component
red	phosphate group
white	sugar (deoxyribose)
clear connector	bond
<b>B A S E S</b>	
blue	cytosine
orange	guanine
yellow	adenine
green	thymine

For activities, consult your CPO Science *Focus on Life Science Teacher's Guide*.

For technical assistance, please call 866.588.6951.