



## Make a DNA Model: What Is the Molecular Structure of DNA?

DNA is the acronym for deoxyribonucleic acid, the molecule that carries all the genetic information required for the reproduction, development, and functioning of all organisms and numerous viruses. The DNA molecule is composed of phosphate groups, ribose molecules, and four different nitrogenous bases—adenine, cytosine, guanine, and thymine. The phosphate groups bind to the ribose sugars to form the molecular backbone of the DNA structure. A nitrogenous base binds each ribose molecule, and a second nitrogenous base attached to a complementary DNA strand. Nitrogenous bases in DNA are bound by hydrogen bonds, which hold together the two complementary DNA strands.

### Watch Video 1

#### Observe Part 1

**Predict:** What mistakes were made when building the third DNA sequence? Would these mistakes affect the structure of a real DNA sequence?

### Watch Video 2

#### Observe Part 2

**Explain:** Were you able to identify all the mistakes made when building the third DNA sequence in **Video 1**? How would you fix the mistakes?

#### Identify an Experimental Design Flaw

What molecular component of DNA is not included in the models shown in **Video 1** and **Video 2**? How would you add this molecule to your own model?



### **Refine/Expand the Experiment**

What else would you change or add to the DNA model to make it more accurate?

### **Practice Scientific Reasoning**

What would happen if two nitrogenous bases that are not a complementary pair aligned in the same base-pair location of a DNA double helix? Explain.

### **Connect to Your World**

Do an online search about the Human Genome Project. What is the Human Genome Project? What was its outcome and impact?

### **Learn More by Exploring These Links**

Make a DNA Model <https://www.flinnsci.com/make-a-dna-model/dc10649/>

Gene Expression Essentials <https://phet.colorado.edu/en/simulation/gene-expression-basics>

### **At-Home Extension**

You may use the instructions provided in **Video 1** to build your own DNA model at home. If you do not have access to chenille wires, stiff electrical wire coated with plastic would work well. You could also use colored tape to cut small pentagons that would represent the ribose molecules.