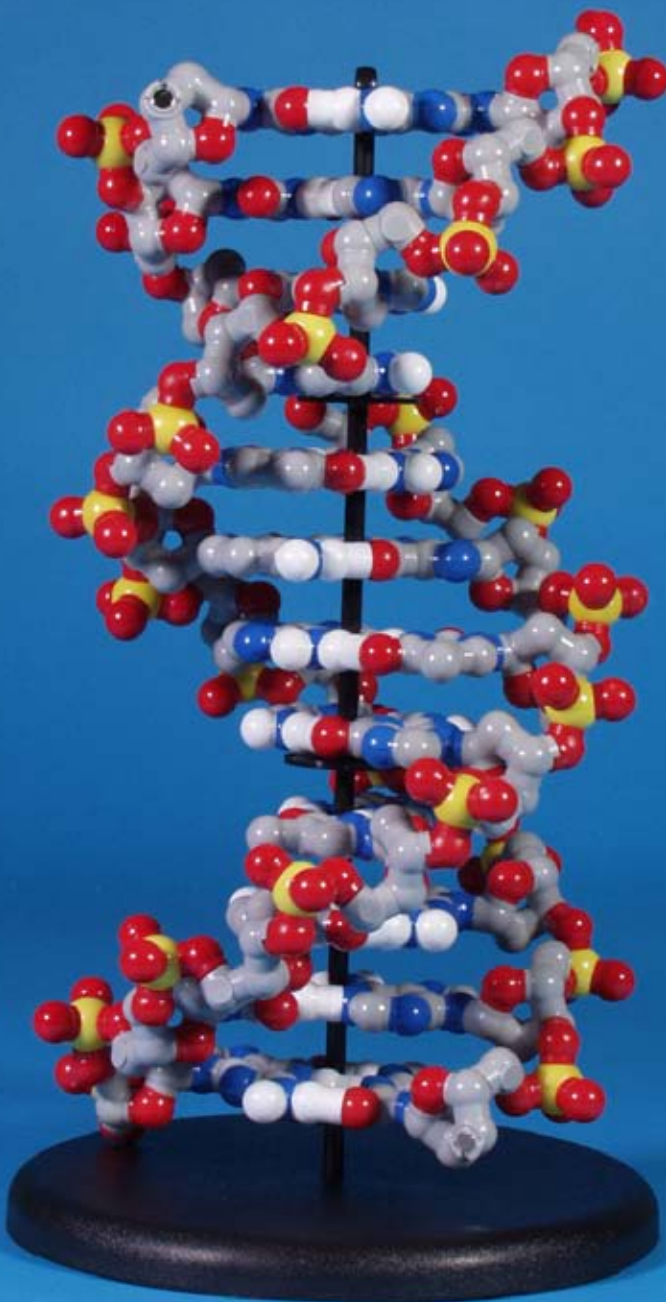


The DNA Discovery Kit®



Contents

Nucleotides
6 Adenosine
6 Thymine
6 Guanine
6 Cytosine
Sheet of Labels
2 Mini-Toobers
Black Helix Guide
Black Rod
Black Base

Assembly Directions on Next Page

Photos by Sean Ryan

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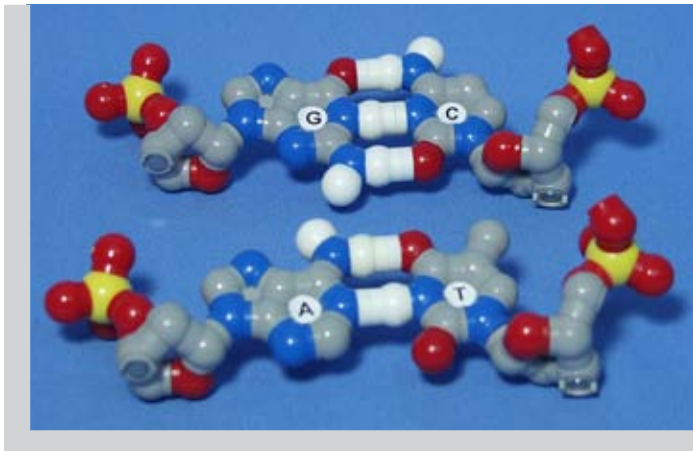
Teacher Notes, Student Handout and other resources at 3dmoleculardesigns.com/resources.php

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The DNA Discovery Kit[®]

Assembly Instructions

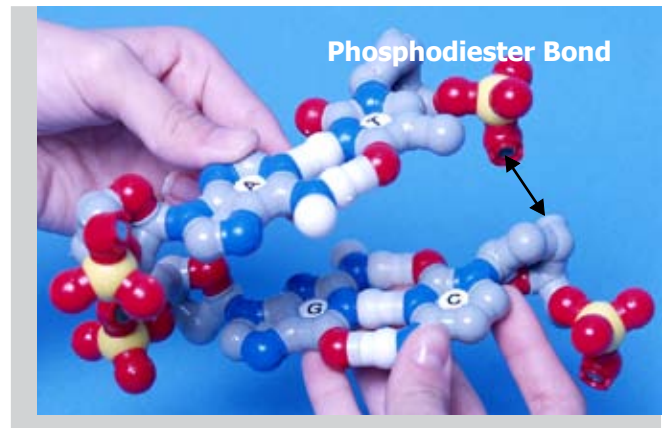
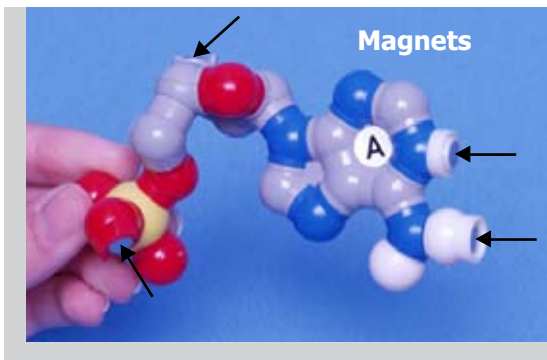


Nucleotides Assembled

The nucleotides are preassembled.

To label a nucleotide, peel a letter from its protective backing and press it into the depression on a corresponding base. After placing the label on one side, flip the base over and repeat with another label. Use the photo to correctly place the labels on the nucleotides. (Labels only fit inside the larger depression on the Adenosine and Guanine nucleotides.)

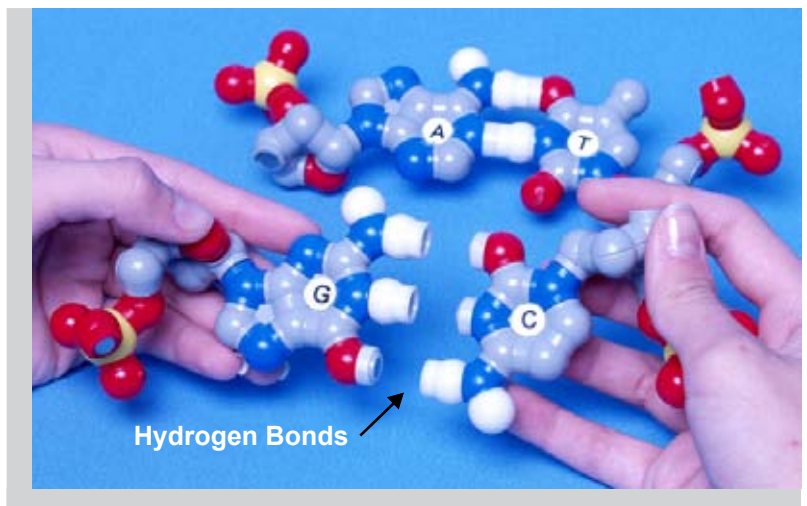
Magnets Simulate Bonding



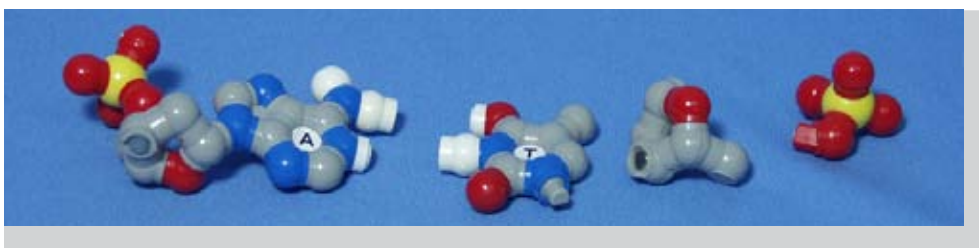
The nucleotide models have magnets embedded in them to simulate the spontaneous bonding that occurs between complementary base pairs (hydrogen bonds) and between the phosphate group of one nucleotide to the deoxyribose of another nucleotide (phosphodiester bonds).

Arrows in the photo above point to the magnet in each piece.

You can break the hydrogen bonds by pulling apart the G-C and A-T base pairs. When examining the deoxyribose and phosphate groups, you will see the single magnet embedded in the deoxyribose group and one embedded in the phosphate group.



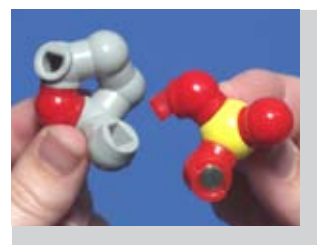
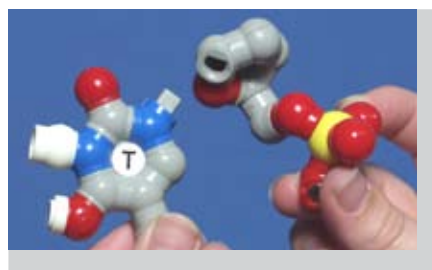
The DNA Discovery Kit[®]



Nucleotides Separate Into Component Parts

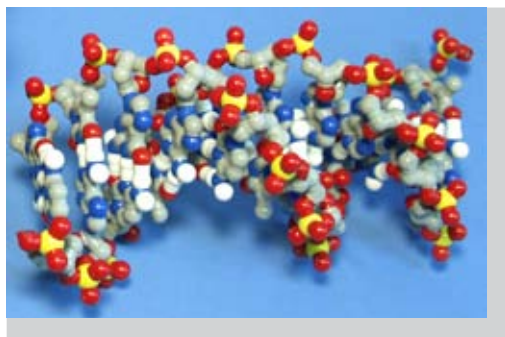
Each nucleotide separates into its three component parts — the nitrogenous base, deoxyribose group and phosphate group.

To separate the pieces, pull the three pieces apart as shown in the photos. Be sure to pull the pieces apart with a straight motion. **The attachment posts can break if a twisting or bending motion is used.**



Three Ways to Display DNA Discovery Kit[®]

We encourage you to leave the DNA Discovery Kit[®] pieces out on a table for your students to explore in their free time.



You can also easily display or store the fully assembled double helix by setting up the black base and black rod that are included in the 12 Base Pair DNA Discovery Kit[®].

Or you can hang the double helix from a ceiling by threading a strong cord through the eyelet at the top of the rod. **Do not use the black base when hanging the DNA.**





The DNA Discovery Kit[®]

Setting Up Base & Rod to Displaying DNA



Push the bottom of the rod (end without the eyelet) into the black base. Press down firmly so it rests securely in the base. The lowest disk will rest about 3/4 inch above the base.

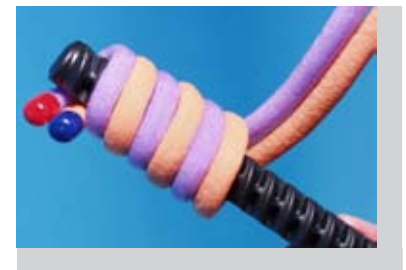
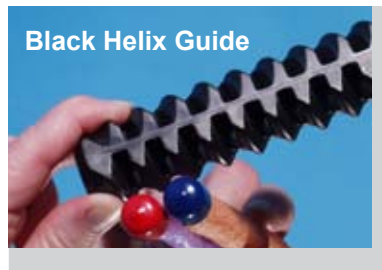
Before correctly placing the Guanine - Cytosine base pairs around the rod, look carefully at the models. You will see that the Guanine model has two hydrogens that are longer than the third hydrogen. (See photo at right and refer to the page 2 photo labeled, *Hydrogen Bonds*.) The Cytosine model has one hydrogen that is longer and two shorter hydrogens. Adenosine and Thymine each have one longer hydrogen and one shorter hydrogen.



The Guanine - Cytosine base pair should be placed so that the rod is between the longer and the shorter hydrogen. (See the above photos.) The Adenosine - Thymine base pair should be placed so that the rod is between the two hydrogens (one is longer and one is shorter). As each base pair is placed on the rod, rotate it until it forms the phosphodiester bond with the previous base pair. Four base pairs fit above each disk.

Making Mini-Toober DNA

Line up two Mini-Toobers adjacent to each other and with the first two grooves in the black helix guide. One Mini-Toober should have a blue end cap and the other a red end cap. Wrap the rest of the Mini-Toobers around the guide following the grooves.



Once the Mini-Toobers are wound around the guide, you can remove them by twisting the guide, as though you are unscrewing it from the Mini-Toobers. Then loosen and separate the coils by gently unwinding and pulling them apart.



(See the Activities and Teacher Notes at 3dmoleculardesigns.com/resources.php for information on this activity.)

