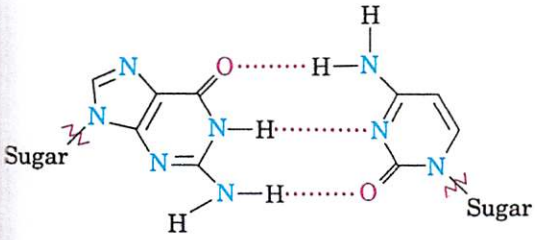
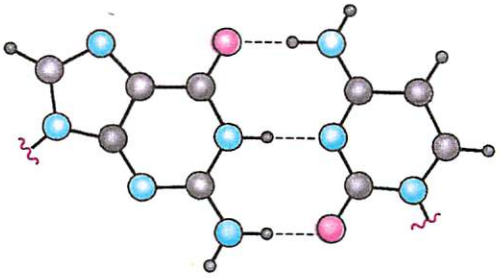
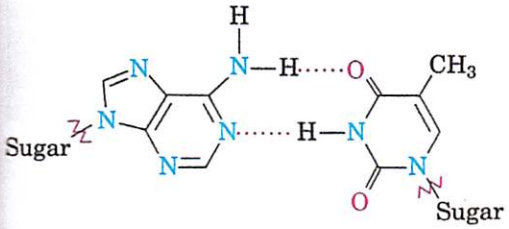
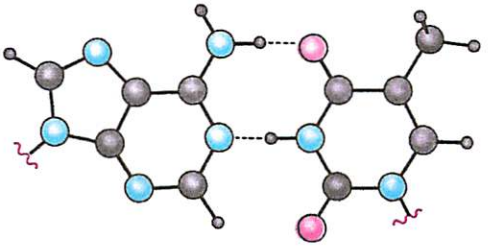
In 1953, James Watson[1] and Francis Crick[2] made their now classic proposal for the secondary structure of DNA. According to the Watson–Crick model, DNA consists of two polynucleotide strands coiled around each other in a **double helix**. The two strands run in opposite directions and are held together by hydrogen bonds between specific pairs of bases. Adenine (A) and thymine (T) form strong hydrogen bonds to each other but not to C or G. Similarly, guanine (G) and cytosine (C) form strong hydrogen bonds to each other but not to A or T.





(Guanine) G ⋮ ⋮ ⋮ ⋮ ⋮ C (Cytosine)





(Adenine) A : : : : : T (Thymine)

The two strands of the DNA double helix aren't identical; rather, they're complementary. Whenever a C base occurs in one strand, a G base occurs opposite it in the other strand. When an A base occurs in one strand, a T appears opposite it in the other strand. This complementary pairing of bases explains why A and T, and C and G, are always found in equal amounts. Figure 29.7 illustrates this base pairing, showing how the two complementary strands are coiled into the double helix. X-ray measurements show that the DNA double helix is 20 Å wide, that there are exactly 10 base pairs in each full turn, and that each turn is 34 Å in height.

A helpful mnemonic device to remember the nature of the hydrogen bonding between the four DNA bases is the simple phrase "Pure silver taxi."

Pure	Silver	Taxi
Pur	Ag	TC
The purine bases,	A and G,	hydrogen-bond to T and C.

[1]James Dewey Watson (1928–); b. Chicago, Ill.; Ph.D. Indiana; professor, Harvard University; Nobel Prize in medicine (1960).

[2]Francis H. C. Crick (1916–); b. England; Ph.D. Cambridge; professor, Cambridge University; Nobel Prize in medicine (1960).