Name Period Date

SECTION
8.2

STRUCTURE OF DNA
Power Notes

Parts of a DNA molecule

Overall shape:

Nitrogen-containing bases

Backbone

Pyrimidines

Purines

1.

2.

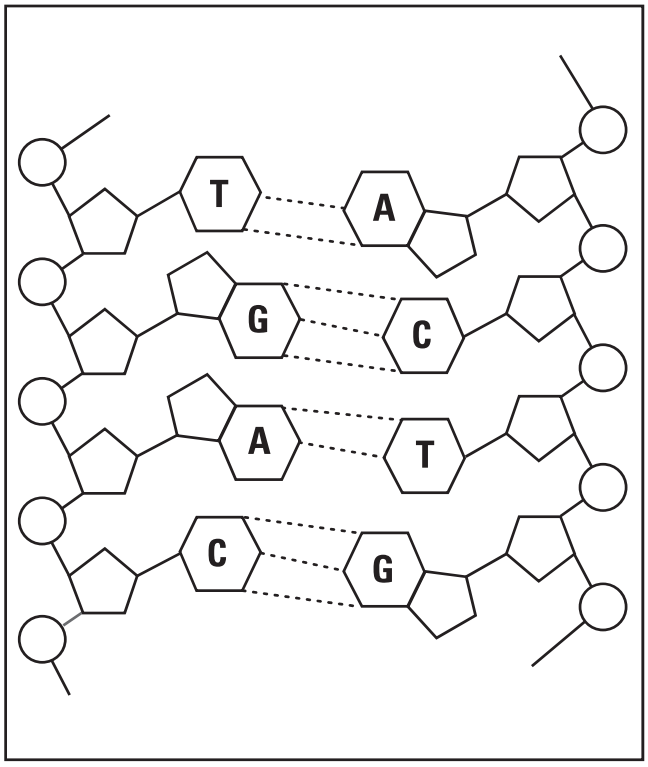
Base pairing rules:

Bonding

1.

2.

Chargaff's rules:



Copyright © McDougal Littell/Houghton Mifflin Company.

Name Period Date

SECTION 8.2

STRUCTURE OF DNA

Reinforcement

KEY CONCEPT DNA structure is the same in all organisms.

DNA is a chain of nucleotides. In DNA, each **nucleotide** is made of a phosphate group, a sugar called deoxyribose, and one of four nitrogen-containing bases. These four bases are cytosine (C), thymine (T), adenine (A), and guanine (G). Two of the bases, C and T, have a single-ring structure. The other two bases, A and G, have a double-ring structure.

Although scientists had a good understanding of the chemical structure of DNA by the 1950s, they did not understand its three-dimensional structure. The contributions of several scientists helped lead to this important discovery.

- Erwin Chargaff analyzed the DNA from many different organisms and realized that the amount of A is equal to the amount of T, and the amount of C is equal to the amount of G. This A = T and C = G relationship became known as Chargaff's rules.
- Rosalind Franklin and Maurice Wilkins studied DNA structure using x-ray crystallography. Franklin's data suggested that DNA is a helix consisting of two strands that are a regular, consistent width apart.

James Watson and Francis Crick applied Franklin's and Chargaff's data in building a three-dimensional model of DNA. They confirmed that DNA is a **double helix** in which two strands of DNA wind around each other like a twisted ladder. The sugar and phosphate molecules form the outside strands of the helix, and the bases pair together in the middle, forming hydrogen bonds that hold the two sides of the helix together. A base with a double ring pairs with a base with a single ring. Thus, in accordance with Chargaff's rules, they realized that A pairs with T, and C pairs with G. The bases always pair this way, which is called the **base pairing rules.**

1. What did Chargaff's rules state?

_____

2. What did Franklin's data show about the three-dimensional structure of DNA?

_____

_____

3. What forms the backbone strands of the DNA double helix? What connects these strands in the middle?

_____

_____

Copyright © McDougal Littell/Houghton Mifflin Company.