

CHAPTER 3 - The Molecules of Cells

Chapter Reading Guide

1. Explain how spider silk is produced. Describe the special properties of spider silk that help spiders capture prey.
2. Explain why carbon is unparalleled in its ability to form large, diverse molecules. Define organic compounds, hydrocarbons, a carbon skeleton, and an isomer.
3. Describe the properties of and distinguish between the four functional groups of organic molecules.
4. List the four classes of macromolecules, explain the relationship between monomers and polymers, and compare the processes of dehydration synthesis and hydrolysis.
5. Describe the structures, functions, properties, and types of carbohydrate, lipid, and protein molecules by completing the table below.

Macromolecule	Structure	Function	Examples
carbohydrate			
lipid			
protein			

6. Describe the major achievements of Linus Pauling.

7. Compare and contrast the structures and functions of DNA and RNA. Next, use the strand of DNA below to create a complementary strand of DNA (replication) as well as a strand of RNA (transcription).

The diagram shows a vertical DNA double helix. The left strand is the template strand, oriented 3' to 5' from top to bottom. Its bases are A, T, C, G, T. The right strand is the complementary strand, oriented 5' to 3' from top to bottom. Its bases are T, A, G, C, A. A box highlights the top portion of the template strand (A, T, C) and the corresponding top portion of the complementary strand (T, A, G). To the right of this box is a label: "Complementary strand of DNA".

Complementary strand of DNA

The diagram shows a vertical DNA double helix, identical to the one above. The left strand is the template strand (3' to 5' top to bottom) with bases A, T, C, G, T. The right strand is the transcribed RNA strand, oriented 5' to 3' from top to bottom. Its bases are U, A, G, C, A. A box highlights the top portion of the template strand (A, T, C) and the corresponding top portion of the RNA strand (U, A, G). To the right of this box is a label: "Transcribed strand of RNA".

Transcribed strand of RNA