

# Chapter 11

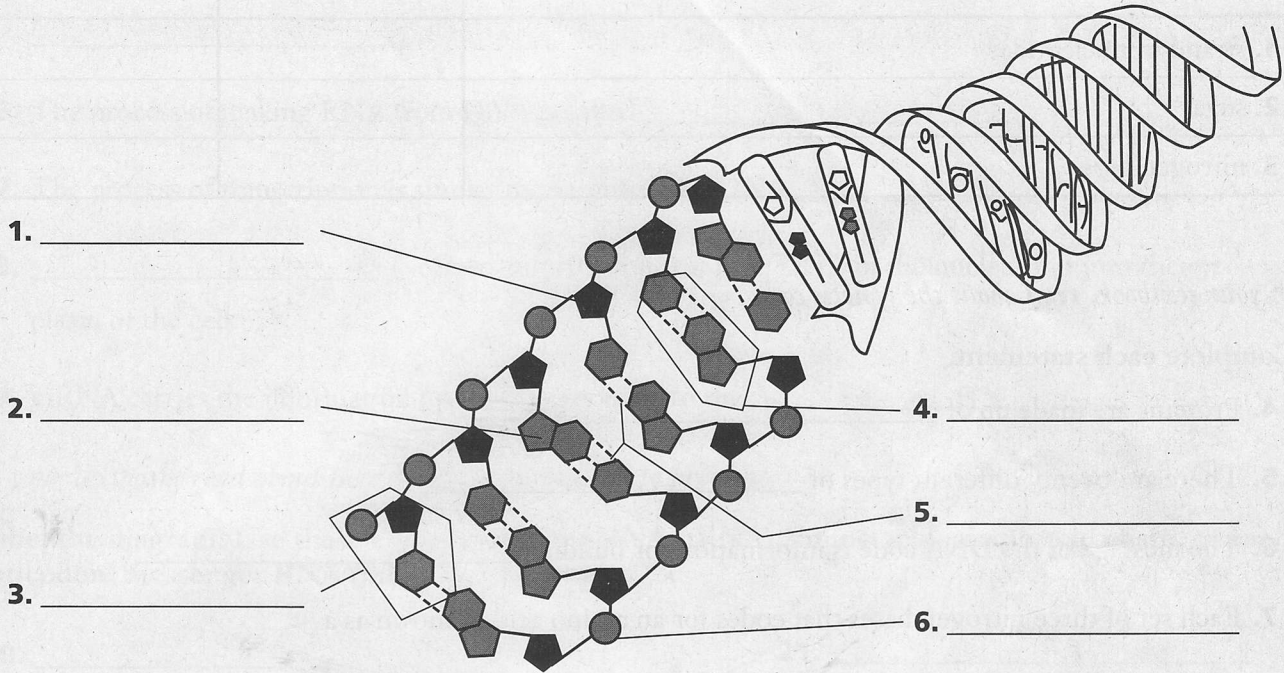
## DNA and Genes

### Reinforcement and Study Guide

#### Section 11.1 DNA: The Molecule of Heredity

In your textbook, read about what DNA is and the replication of DNA.

Label the diagram. Use these choices: nucleotide, deoxyribose, phosphate group, nitrogen base, hydrogen bonds, base pair.



Complete each statement.

7. \_\_\_\_\_, guanine (G), cytosine (C), and thymine (T) are the four \_\_\_\_\_ in DNA.
8. In DNA, \_\_\_\_\_ always forms hydrogen bonds with guanine (G).
9. The sequence of \_\_\_\_\_ carries the genetic information of an organism.
10. The process of \_\_\_\_\_ produces a new copy of an organism's genetic information, which is passed on to a new cell.
11. The double-coiled shape of DNA is called a \_\_\_\_\_.

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**Section 11.2 From DNA to Protein**

*In your textbook, read about genes and proteins and RNA.*

Complete the chart on the three chemical differences between DNA and RNA.

Structure	DNA	RNA
1. strand of nucleotides		
2. sugar		
3. nitrogen base		

*In your textbook, read about the genetic code.*

Complete each statement.

4. Proteins are made up of \_\_\_\_\_.
5. There are twenty different types of \_\_\_\_\_.
6. The message of the DNA code is information for building \_\_\_\_\_.
7. Each set of three nitrogen bases that codes for an amino acid is known as a \_\_\_\_\_.
8. The amino acid \_\_\_\_\_ is represented by the mRNA codon ACA.
9. \_\_\_\_\_ and \_\_\_\_\_ are mRNA codons for phenylalanine.
10. There can be more than one \_\_\_\_\_ for the same amino acid.
11. For any one codon, there can be only one \_\_\_\_\_.
12. The genetic code is said to be universal because a codon represents the same \_\_\_\_\_ in almost all organisms.
13. \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_ are stop codons.
14. \_\_\_\_\_ and \_\_\_\_\_ are amino acids that are each represented by only one codon.

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**Section 11.2 From DNA to Protein, continued**

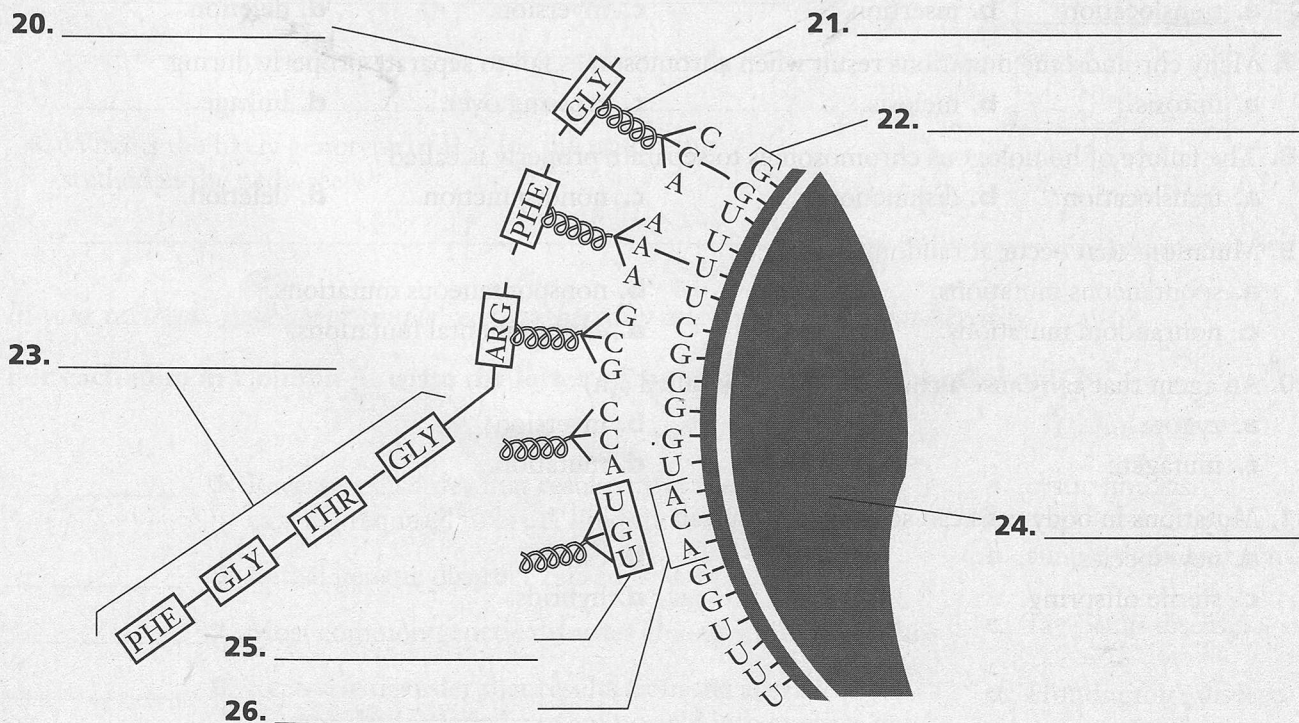
*In your textbook, read about transcription from DNA to mRNA.*

Complete each statement.

15. Proteins are made in the cytoplasm of a cell, whereas DNA is found only in the \_\_\_\_\_.
16. The process of making RNA from DNA is called \_\_\_\_\_.
17. The process of transcription is similar to the process of DNA \_\_\_\_\_.
18. \_\_\_\_\_ carries information from the DNA in the nucleus out into the cytoplasm of the cell.
19. mRNA carries the information for making proteins to the \_\_\_\_\_.

*In your textbook, read about translation from mRNA to protein.*

Label the diagram. Use these choices: transfer RNA (tRNA), amino acid, amino acid chain, codon, anticodon, messenger RNA (mRNA), ribosome.



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*In your textbook, read about mutation: a change in DNA.*

**Circle the letter of the choice that best completes the statement.**

- A mutation is any mistake or change in the  
a. cell.                      b. DNA sequence.                      c. ribosomes.                      d. nucleus.
- A point mutation is a change in  
a. several bases in mRNA.                      b. several bases in tRNA.  
c. a single base pair in DNA.                      d. several base pairs in DNA.
- A mutation in which a single base is added or deleted from DNA is called  
a. a frame shift mutation.                      b. a point mutation.                      c. translocation.                      d. nondisjunction.
- Chromosomal mutations are especially common in  
a. humans.                      b. animals.                      c. bacteria.                      d. plants.
- Few chromosome mutations are passed on to the next generation because  
a. the zygote usually dies.  
b. the mature organism is sterile.  
c. the mature organism is often incapable of producing offspring.  
d. all of the above.
- When part of one chromosome breaks off and is added to a different chromosome, the result is a(n)  
a. translocation.                      b. insertion.                      c. inversion.                      d. deletion.
- Many chromosome mutations result when chromosomes fail to separate properly during  
a. mitosis.                      b. meiosis.                      c. crossing over.                      d. linkage.
- The failure of homologous chromosomes to separate properly is called  
a. translocation.                      b. disjunction.                      c. nondisjunction.                      d. deletion.
- Mutations that occur at random are called  
a. spontaneous mutations.                      b. nonspontaneous mutations.  
c. nonrandom mutations.                      d. environmental mutations.
- An agent that can cause a change in DNA is called a(n)  
a. zygote.                      b. inversion.  
c. mutagen.                      d. mutation.
- Mutations in body cells can sometimes result in  
a. new species.                      b. cancer.  
c. sterile offspring.                      d. hybrids.