**Test-Taking Tip**

When asked to find the solution to a problem, such as the complementary sequence of DNA or RNA, first solve the problem on scratch paper. Then, compare your answer with the options provided.

*Directions: Choose the letter that best answers the question or completes the statement.*

**1.** During replication, which sequence of nucleotides would bond with the DNA sequence TATGA?
(A) TATGA (D) AUAGA
(B) UAUGA (E) ATACA
(C) ATACT

**2.** In which of the following ways does RNA differ from DNA?
(A) RNA contains uracil and deoxyribose.
(B) RNA contains ribose and thymine.
(C) RNA contains uracil and ribose.
(D) RNA contains adenine and ribose.
(E) RNA contains uracil, thymine, and ribose.

**3.** Which of the following nucleotide(s) bond(s) with adenine?
(A) thymine only
(B) uracil only
(C) cytosine and guanine
(D) thymine and uracil
(E) thymine, uracil, and cytosine

**4.** The process of decoding mRNA into a polypeptide chain is known as
(A) transformation.
(B) transpiration.
(C) translation.
(D) transcription.
(E) translocation.

**5.** Which of the following does NOT describe the structure of DNA?
(A) double helix
(B) nucleotide polymer
(C) sugar-phosphate backbone
(D) contains adenine-uracil pairs
(E) double stranded

**6.** What did Hershey and Chase's work show?
(A) Genes are probably made of DNA.
(B) Genes are probably made of protein.
(C) Genes are made of both DNA and protein.
(D) Viruses contain DNA but not protein.
(E) Bacteria contain DNA but not protein.

**7.** Anticodons are part of the structure of
(A) DNA.
(B) messenger RNA.
(C) transfer RNA.
(D) ribosomal RNA.
(E) proteins.

*Questions 8–9*

A scientist analyzed several DNA samples from exons to determine the relative proportions of purine and pyrimidine bases. Her data are summarized in the table below.

**Percentages of Bases in Three Samples**

| Sample | G | C | A | T |
|---|---|---|---|---|
| A | 35 | 35 | 15 | 15 |
| B | 40 | 10 | 40 | 10 |
| C | 25 | 25 | 25 | 25 |

**8.** Which sample(s) support(s) the base-pairing rules?
(A) Sample A only (D) Samples A and C
(B) Sample B only (E) Samples A, B, and C
(C) Sample C only

**9.** If the scientist had analyzed mRNA rather than DNA, what percentage of uracil would you expect to find in Sample B?
(A) 10 (D) 40
(B) 25 (E) 80
(C) 35

*Questions 10–12 Each of the lettered choices below refers to the following numbered statements. Select the best lettered choice. A choice may be used once, more than once, or not at all.*

(A) Mutation (D) Genetic code
(B) Double helix (E) Transcription
(C) Protein synthesis

**10.** RNA molecules are produced by copying part of the nucleotide sequence of DNA into a complementary sequence in RNA.

**11.** Structure of DNA

**12.** Heritable change in the DNA sequence that affects genetic information

## Standardized Test Prep

**1.** C **5.** D **9.** A
**2.** C **6.** A **10.** E
**3.** D **7.** C **11.** B
**4.** C **8.** D **12.** A

## Writing in Science

In their letters to Mendel, students should describe the structure of a typical eukaryotic gene and how these genes are part of DNA sequences that, along with DNA-binding proteins, form chromatin, the substance that forms chromosomes. Students should describe the genetic code and how it specifies proteins. They should also include a description of what proteins are and how they affect the characteristics of an organism.

## Performance-Based Assessment

Check student models for structural accuracy of DNA, mRNA, and tRNA. Student models should reflect an understanding of the roles of DNA, RNA, and ribosomes in protein synthesis and the significance of codons and anticodons in the process.

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