What Is DNA and How Is It Structured?

Worksheet

DNA is a double-helix molecule made of nucleotides (sugar, phosphate, and a nitrogenous base: A, T, C or G) that stores genetic information; adenine always pairs with thymine, and cytosine always pairs with guanine.

Questions

1. What shape does DNA have?

A) Single straight chain
B) Double helix
C) Triangle
D) Branched tree

2. Which base pairs with adenine?

A) Guanine
B) Cytosine
C) Thymine
D) Uracil

3. What are the three parts of a nucleotide?

A) Protein, lipid, sugar
B) Sugar, phosphate, nitrogenous base
C) Amino acid, ribosome, enzyme
D) Chromosome, gene, allele

4. What is DNA's main function in a cell?

A) Producing ATP
B) Storing and transmitting genetic information
C) Building the cell membrane
D) Digesting nutrients

5. A DNA strand has 30 adenine (A) bases out of 100 total bases. Using complementary base pairing (A=T, CG), how many thymine (T) and guanine plus cytosine bases are there?

6. A gene segment reads 5'-ATG CGA TTC-3' on one strand. What is the complementary strand (3' to 5')?

7. A DNA molecule has 40% GC content and 200 total base pairs. How many adenine bases does it contain?

8. Define: What does DNA stand for?

9. Define: What is DNA's shape?

10. Define: What are the four DNA bases?

Answer Key

1. B) Double helix - DNA is a double helix - two strands wound around each other.

2. C) Thymine - Adenine always pairs with thymine in DNA (A-T).

3. B) Sugar, phosphate, nitrogenous base - Each nucleotide has a sugar, a phosphate group, and a nitrogenous base.

4. B) Storing and transmitting genetic information - DNA's main role is storing and passing on genetic instructions.

5. A = T, so T = 30 Remaining bases = 100 30 (A) 30 (T) = 40 C = G, so C = 20 and G = 20

6. Pair each base: A-T, T-A, G-C, C-G, G-C, A-T, T-A, T-A, C-G Complementary strand (3'5'): TAC GCT AAG

7. GC% = 40%, so AT% = 100% 40% = 60% A% = AT% 2 = 30% A bases = 30% 200 = 60 adenine bases

8. Deoxyribonucleic acid - the molecule that carries genetic instructions.

9. A double helix - two strands twisted around each other.

10. Adenine (A), Thymine (T), Cytosine (C), and Guanine (G).