

DNA Structure Worksheet

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Part 1: Building a Foundation

What does DNA stand for?

Hint: Think about the full name of DNA.

- A) Deoxyribonucleic Acid
- A) Deoxyribose Nucleic Acid
- A) Dioxyribonucleic Acid
- A) Deoxyribonucleotide Acid

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Which of the following are components of a nucleotide in DNA? (Select all that apply)

Hint: Consider the parts that make up a nucleotide.

- A) Phosphate group

- A) Ribose sugar
- A) Deoxyribose sugar
- A) Nitrogenous base

Which of the following are components of a nucleotide in DNA? (Select all that apply)

Hint: Consider the three main parts of a nucleotide.

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List the four nitrogenous bases found in DNA.

Hint: Think about the letters that represent the bases.

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Which base pairs with Adenine in DNA?

Hint: Think about the complementary base pairing rules.

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Part 2: Application and Analysis

During DNA replication, which enzyme is responsible for unwinding the DNA double helix? (Select all that apply)

Hint: Consider the enzymes involved in the replication process.

- A) DNA polymerase
- A) Helicase
- A) Ligase
- A) Primase

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Hint: Consider how bases match up during replication.

In a hypothetical scenario, if a DNA strand has a sequence of AGCT, what would be the sequence of the complementary strand?

Hint: Use the base pairing rules to determine the answer.

- A) TCGA
- A) CGAT
- A) AGCT
- A) TCGU

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Analyze the impact of a mutation that changes an adenine to a guanine in a DNA sequence. How might this affect the structure and function of the resulting protein?

Hint: Consider the implications of mutations on protein synthesis.

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Hint: Consider the implications of amino acid changes.

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Hint: Consider the implications of mutations on protein synthesis.

Which of the following scenarios would most likely disrupt the stability of the DNA double helix? (Select all that apply)

Hint: Think about factors that could affect the structure of DNA.

- A) A decrease in hydrogen bonding
- A) An increase in covalent bonding
- A) A substitution of thymine with uracil
- A) A deletion of a phosphate group

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Part 3: Evaluation and Creation

Evaluate the role of DNA in hereditary diseases. How can understanding DNA structure help in developing treatments?

Hint: Consider the implications of DNA knowledge in medicine.

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Hint: Consider the relationship between DNA and disease.

Evaluate the role of DNA in hereditary diseases. How can understanding DNA structure help in developing treatments?

Hint: Consider the implications of DNA structure on health.

Imagine you are designing a new type of DNA molecule for a synthetic biology project. Which features would you prioritize to ensure stability and functionality? (Select all that apply)

Hint: Think about the characteristics that contribute to DNA stability.

- A) Strong covalent bonds in the backbone
- A) Flexible hydrogen bonds between bases
- A) High variability in base pairing
- A) Uniform strand length

Imagine you are designing a new type of DNA molecule for a synthetic biology project. Which features would you prioritize to ensure stability and functionality? (Select all that apply)

Hint: Think about the properties that enhance DNA performance.

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Propose a method for using DNA technology to solve a real-world problem, such as forensic analysis or genetic engineering. Explain your approach and its potential impact.

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Hint: Consider practical applications of DNA technology.