

## Worksheet DNA Replication Answer Key PDF

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### Part 1: Building a Foundation

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**Which enzyme is responsible for unwinding the DNA double helix during replication?**

undefined. A) DNA Ligase

**undefined. B) DNA Helicase ✓**

undefined. C) DNA Polymerase

undefined. D) Primase

The correct answer is DNA Helicase, which unwinds the DNA strands.

**Select all components that make up a nucleotide in DNA.**

**undefined. A) Phosphate group ✓**

undefined. B) Ribose sugar

**undefined. C) Deoxyribose sugar ✓**

**undefined. D) Nitrogen base ✓**

Nucleotides in DNA consist of a phosphate group, deoxyribose sugar, and a nitrogen base.

**Explain the semi-conservative model of DNA replication.**

**The semi-conservative model states that each new DNA molecule consists of one original strand and one newly synthesized strand.**

**List the four nitrogen bases found in DNA.**

1. 1.

**Adenine**

2. 2.

**Thymine**

3. 3.

**Cytosine**

4. 4.

**Guanine**

The four nitrogen bases in DNA are adenine, thymine, cytosine, and guanine.

**What is the role of DNA Polymerase in DNA replication?**

undefined. A) Unwinds the DNA strands

undefined. B) Synthesizes RNA primers

**undefined. C) Adds nucleotides to the growing DNA strand ✓**

undefined. D) Joins Okazaki fragments

DNA Polymerase adds nucleotides to the growing DNA strand during replication.

**Part 2: Application and Analysis**

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**If a mutation occurs in the gene coding for DNA Ligase, what is the most likely consequence during DNA replication?**

undefined. A) DNA strands will not unwind.

**undefined. B) Okazaki fragments will not be joined. ✓**

undefined. C) RNA primers will not be synthesized.

undefined. D) Nucleotides will not be added to the DNA strand.

The most likely consequence is that Okazaki fragments will not be joined, leading to incomplete DNA strands.

**How might errors in DNA replication be corrected?**

undefined. A) By DNA Helicase unwinding the DNA

**undefined. B) By DNA Polymerase proofreading the DNA ✓****undefined. C) By DNA Ligase joining the DNA fragments ✓**

undefined. D) By Primase synthesizing new RNA primers

Errors in DNA replication can be corrected by DNA Polymerase proofreading the DNA and DNA Ligase joining DNA fragments.

**Imagine a scenario where the replication fork is moving slower than usual. What could be a potential cause, and how might this affect DNA replication?**

**Potential causes could include the presence of DNA damage or lack of necessary nucleotides, which could lead to slower replication and increased risk of errors.**

**Which of the following best describes the relationship between the leading and lagging strands during DNA replication?**

undefined. A) Both are synthesized continuously.

undefined. B) Both are synthesized discontinuously.

undefined. **C) The leading strand is synthesized continuously, while the lagging strand is synthesized discontinuously.** ✓

undefined. D) The leading strand is synthesized discontinuously, while the lagging strand is synthesized continuously.

The leading strand is synthesized continuously, while the lagging strand is synthesized discontinuously.

**Analyze the roles of enzymes in DNA replication. Which enzymes are directly involved in ensuring the accuracy of DNA replication?**

undefined. A) DNA Helicase

undefined. **B) DNA Polymerase** ✓

undefined. C) Primase

undefined. **D) DNA Ligase** ✓

DNA Polymerase and DNA Ligase are directly involved in ensuring the accuracy of DNA replication.

**Discuss how the semi-conservative nature of DNA replication contributes to genetic stability.**

**The semi-conservative nature of DNA replication helps maintain genetic stability by ensuring that each new DNA molecule retains one original strand, reducing the likelihood of mutations.**

### **Part 3: Evaluation and Creation**

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**Which scenario would most likely lead to a higher mutation rate during DNA replication?**

undefined. A) Efficient proofreading by DNA Polymerase

undefined. B) Lack of RNA primers

undefined. C) Dysfunctional DNA Ligase

**undefined. D) Impaired DNA Polymerase proofreading ability ✓**

A scenario with impaired DNA Polymerase proofreading ability would most likely lead to a higher mutation rate.

**Evaluate the impact of environmental factors on DNA replication. Which factors could potentially lead to replication errors?**

**undefined. A) High radiation exposure ✓**

undefined. B) Optimal temperature conditions

**undefined. C) Chemical mutagens ✓**

undefined. D) Adequate nutrient supply

High radiation exposure and chemical mutagens could potentially lead to replication errors.

**Propose a hypothetical experiment to test the effect of a new chemical compound on the rate of DNA replication. Describe the experimental setup and expected outcomes.**

**The experiment could involve treating cells with the compound and measuring the rate of DNA synthesis using a labeled nucleotide, with expected outcomes indicating whether the compound enhances or inhibits replication.**