

### Introduction to DNA (Page 1)

Read the following text and answer the questions that follow:

DNA (Deoxyribonucleic acid) is a molecule that contains the genetic instructions used in the development and function of all living organisms. DNA is made up of two strands of nucleotides that are twisted together in a double helix structure. The sugar-phosphate backbone and nitrogenous bases are the two main components of DNA.

1. What is the primary function of DNA in cells?

2. Describe the structure of DNA, including the sugar-phosphate backbone and nitrogenous bases.

### The Central Dogma (Page 2)

Read the following text and answer the questions that follow:

The Central Dogma is the process by which genetic information is passed from DNA to RNA to proteins. The steps of the Central Dogma are transcription and translation. Transcription is the process by which genetic information is copied from DNA into RNA, while translation is the process by which RNA is translated into proteins.

1. What is the Central Dogma?

2. Describe the steps of the Central Dogma.

## DNA Replication (Page 3)

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Read the following text and answer the questions that follow:

DNA replication is the process by which a cell makes an exact copy of its DNA before cell division. The steps of DNA replication are initiation, elongation, and termination. Initiation occurs when the DNA molecule is unwound and an enzyme called helicase is attached. Elongation occurs when new nucleotides are added to the growing DNA strand, while termination occurs when the new DNA molecule is complete.

1. What is DNA replication?

2. Describe the steps of DNA replication.

## Transcription (Page 4)

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Read the following text and answer the questions that follow:

Transcription is the process by which genetic information is copied from DNA into RNA. The steps of transcription are initiation, elongation, and termination. Initiation occurs when the DNA molecule is unwound and an enzyme called RNA polymerase is attached. Elongation occurs when new nucleotides are added to the growing RNA strand, while termination occurs when the new RNA molecule is complete.

1. What is transcription?

2. Describe the steps of transcription.

Page

## Multiple Choice Questions (Page 5)

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Choose the correct answer for each question:

1. What is the primary function of DNA in cells?

- a) To store genetic information
- b) To synthesize proteins
- c) To regulate cell growth
- d) To respond to stimuli

2. Which of the following is a key feature of the central dogma?

- a) DNA is transcribed into RNA, which is then translated into protein
- b) DNA is translated into protein directly
- c) RNA is transcribed into DNA
- d) Protein is synthesized from RNA without DNA

## Short Answer Questions (Page 6)

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Answer each question in complete sentences:

1. Describe the structure of DNA, including the sugar-phosphate backbone and nitrogenous bases.

2. Explain the process of transcription, including the role of RNA polymerase and the synthesis of mRNA.

Page

## Essay Question (Page 7)

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Choose one of the following essay questions and answer it in complete sentences:

1. Discuss the importance of DNA in genetics and biotechnology, providing examples of how DNA is used in these fields.

2. Describe the central dogma, including the flow of genetic information from DNA to RNA to protein. Explain the significance of the central dogma in understanding genetic inheritance and expression.

## Case Study (Page 8)

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Read the following case study and answer the questions that follow:

A patient has a genetic disorder caused by a mutation in the DNA sequence. The mutation affects the production of a protein that is essential for the proper functioning of the body.

1. What is the role of DNA in this case study?

2. How does the mutation in the DNA sequence affect the production of the protein?

## Group Activity (Page 9)

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*Divide into small groups and discuss the following topics:*

1. The importance of DNA in genetics and biotechnology
2. The central dogma and its significance in understanding genetic inheritance and expression
3. The differences between DNA replication and transcription

Group Discussion Space

## Conclusion (Page 10)

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*Summarize the key concepts learned in this activity:*

DNA is a molecule that contains the genetic instructions used in the development and function of all living organisms. The central dogma is the process by which genetic information is passed from DNA to RNA to proteins. DNA replication and transcription are two important processes that occur in cells.

Reflection Space

