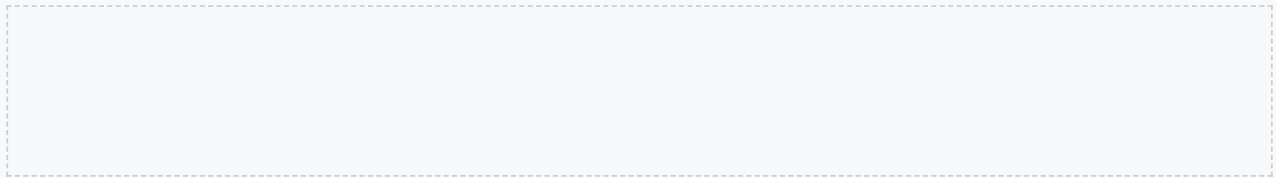




Introduction to DNA

Welcome to the fascinating world of DNA! In this interactive guide, we'll explore the basics of DNA structure and function, and discover how this molecule plays a crucial role in our lives.

DNA (Deoxyribonucleic acid) is a molecule that contains the genetic instructions used in the development and function of all living organisms. It's often referred to as the "blueprint" for life.



The Double Helix Model

The DNA molecule is made up of two complementary strands of nucleotides that are twisted together in a double helix structure. This structure is stabilized by hydrogen bonds between the nucleotides.

Activity 1: DNA Model Building

Using the materials provided, build a model of the DNA double helix. Label the different components, including the sugar-phosphate backbone, nitrogenous bases, and hydrogen bonds.

Genetic Inheritance

Genetic inheritance is the passing of traits from parents to offspring through the transmission of genetic information. DNA plays a crucial role in this process.

Activity 2: Genetic Inheritance Simulation

Use the Punnett square simulation to predict the probability of different traits being inherited. Work in pairs to complete the simulation and discuss your results.

The Central Dogma of Molecular Biology

The central dogma is the process by which genetic information is passed from DNA to RNA to proteins. This process is essential for the synthesis of proteins, which are the building blocks of all living organisms.

Activity 3: Central Dogma Diagram

Create a diagram illustrating the central dogma of molecular biology. Label the different components, including DNA, RNA, and proteins.

DNA Replication and Repair

DNA replication is the process by which a cell makes an exact copy of its DNA before cell division. DNA repair is the process by which a cell corrects damage to its DNA.

Activity 4: DNA Replication Simulation

Use the DNA replication simulation to model the process of DNA replication. Work in pairs to complete the simulation and discuss your results.

Gene Expression and Regulation

Gene expression is the process by which the information in a gene's DNA is converted into a functional product, such as a protein. Gene regulation is the process by which cells control the expression of genes.

Activity 5: Gene Expression Diagram

Create a diagram illustrating the process of gene expression. Label the different components, including DNA, RNA, and proteins.

Applications of DNA Technology

DNA technology has a wide range of applications, including genetic testing, gene editing, and forensic analysis.

Activity 6: DNA Technology Case Study

Read the case study on genetic testing and discuss the following questions:

- What is genetic testing?
- How is genetic testing used in medicine?
- What are the benefits and risks of genetic testing?

Conclusion

In conclusion, DNA structure and function are fundamental concepts in genetics and biotechnology. By understanding the double helix model, genetic inheritance, and the central dogma of molecular biology, we can appreciate the significance of DNA in our lives.

Assessment

Complete the following questions to assess your understanding of DNA structure and function:

1. What is the structure of DNA?
2. What is the function of DNA?
3. What is the central dogma of molecular biology?
4. What is genetic inheritance?
5. What are the applications of DNA technology?

Extension Activity

Research and create a short report on a topic related to DNA structure and function, such as genetic engineering or gene therapy.

Glossary

Define the following terms:

- DNA: Deoxyribonucleic acid
 - Gene: A segment of DNA that codes for a specific protein
 - Genetic inheritance: The passing of traits from parents to offspring through the transmission of genetic information
 - Central dogma: The process by which genetic information is passed from DNA to RNA to proteins
-

Resources

The following resources are available to support your learning:

- DNA model kit
- Genetic inheritance simulation software
- Central dogma diagram
- DNA replication simulation software
- Gene expression diagram
- DNA technology case study

