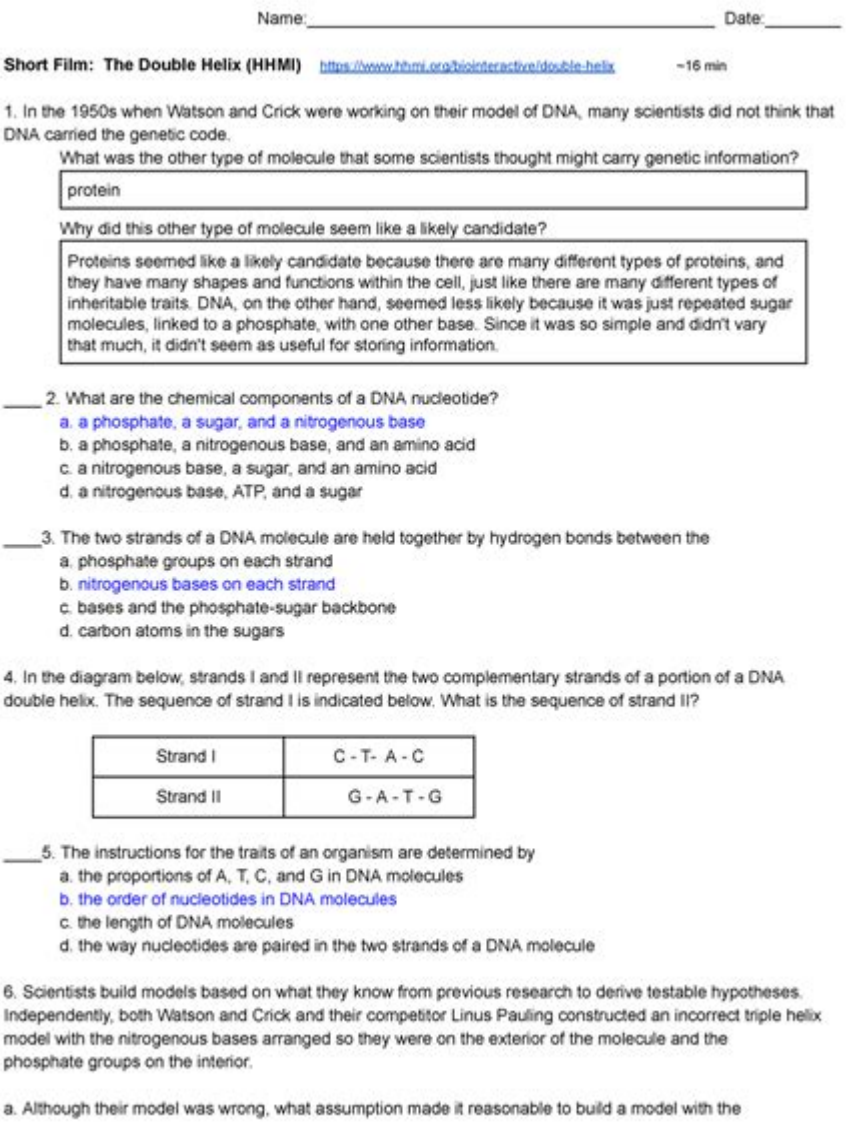
Double Helix Movie Guide Answers



Name:_____ Date:_____

Short Film: The Double Helix (HHMI) https://www.hhmi.org/biointeractive/double-helix ~16 min

1. In the 1950s when Watson and Crick were working on their model of DNA, many scientists did not think that DNA carried the genetic code.

What was the other type of molecule that some scientists thought might carry genetic information?

protein

Why did this other type of molecule seem like a likely candidate?

Proteins seemed like a likely candidate because there are many different types of proteins, and they have many shapes and functions within the cell, just like there are many different types of inheritable traits. DNA, on the other hand, seemed less likely because it was just repeated sugar molecules, linked to a phosphate, with one other base. Since it was so simple and didn't vary that much, it didn't seem as useful for storing information.

____ 2. What are the chemical components of a DNA nucleotide?

a. a phosphate, a sugar, and a nitrogenous base
b. a phosphate, a nitrogenous base, and an amino acid
c. a nitrogenous base, a sugar, and an amino acid
d. a nitrogenous base, ATP, and a sugar

____3. The two strands of a DNA molecule are held together by hydrogen bonds between the

a. phosphate groups on each strand
b. nitrogenous bases on each strand
c. bases and the phosphate-sugar backbone
d. carbon atoms in the sugars

4. In the diagram below, strands I and II represent the two complementary strands of a portion of a DNA double helix. The sequence of strand I is indicated below. What is the sequence of strand II?

Strand I	C - T- A - C
Strand II	G - A - T - G

____5. The instructions for the traits of an organism are determined by

a. the proportions of A, T, C, and G in DNA molecules
b. the order of nucleotides in DNA molecules
c. the length of DNA molecules
d. the way nucleotides are paired in the two strands of a DNA molecule

6. Scientists build models based on what they know from previous research to derive testable hypotheses. Independently, both Watson and Crick and their competitor Linus Pauling constructed an incorrect triple helix model with the nitrogenous bases arranged so they were on the exterior of the molecule and the phosphate groups on the interior.

a. Although their model was wrong, what assumption made it reasonable to build a model with the

Double Helix Movie Guide Answers provide a comprehensive understanding of the film that explores the intricate world of genetics, the discovery of DNA, and the personal and ethical dilemmas faced by scientists in their quest for knowledge. This guide is designed for students, educators, and movie enthusiasts who want to delve deeper into the themes, characters, and scientific concepts presented in the film. This article will serve as a valuable resource, containing detailed insights, discussion questions, and key takeaways to enhance your viewing experience.

Overview of the Film

The film "Double Helix" is a dramatic retelling of the groundbreaking

scientific discovery of the structure of DNA, a milestone that changed the course of biology and medicine. The narrative centers around the lives of James Watson and Francis Crick, the two scientists credited with elucidating the double helical structure of DNA in the early 1950s. Their journey is not just a tale of academic achievement but also a reflection of the intense competition, personal conflicts, and ethical considerations that accompany scientific discovery.

Plot Summary

The film opens with the early days of molecular biology in the 1950s, highlighting the race among several researchers to unravel the structure of DNA. Key events in the film include:

1. Introduction of Main Characters: Watson, a young American scientist, and Crick, a British physicist, form an unlikely partnership fueled by their ambition.
2. The Role of Rosalind Franklin: The film portrays Rosalind Franklin, a talented but overlooked scientist whose X-ray diffraction images of DNA are pivotal to the discovery. Her struggle for recognition adds a significant layer to the narrative.
3. Scientific Rivalry: The film emphasizes the competitive atmosphere among scientists, particularly between Watson and Crick, and their rivals, including Linus Pauling and Maurice Wilkins.
4. The Moment of Discovery: The climax of the film showcases the moment when Watson and Crick finally decipher the double helix structure, a culmination of their hard work and collaboration.

Character Analysis

Understanding the characters in "Double Helix" is essential for grasping the film's thematic depth and emotional resonance. Here are the primary characters:

James Watson

- Personality Traits: Ambitious, driven, and often arrogant, Watson is portrayed as a character willing to go to great lengths for success.
- Character Arc: Over the course of the film, Watson evolves from an egocentric scientist to someone who acknowledges the contributions of others, particularly Franklin.

Francis Crick

- Personality Traits: Crick is depicted as more amiable and level-headed compared to Watson. His scientific integrity often comes into conflict with the competitive atmosphere.
- Character Arc: Crick's journey involves grappling with the ethical implications of their discovery and the treatment of Franklin.

Rosalind Franklin

- Personality Traits: Intelligent, determined, and often underestimated, Franklin is a brilliant scientist who faces gender bias in her field.
- Character Arc: Franklin’s struggle for recognition and her eventual acknowledgment of her crucial role in the discovery highlight the challenges faced by women in science.

Scientific Concepts Explored

The film effectively introduces several key scientific concepts that are essential for understanding the significance of DNA research:

The Structure of DNA

- Double Helix: The film illustrates the iconic double helix structure, which consists of two strands coiled around each other, a discovery that provided insight into genetic inheritance.
- Nucleotide Composition: Viewers learn about the building blocks of DNA—adenine, thymine, cytosine, and guanine—and how their pairing is critical to the stability of the DNA molecule.

X-ray Crystallography

- Technique Overview: The film highlights the importance of X-ray crystallography in studying molecular structures, showcasing Franklin’s work in producing the famous Photograph 51.
- Scientific Collaboration: It emphasizes the collaborative nature of scientific research and how different techniques can complement one another.

Thematic Considerations

"Double Helix" weaves several thematic elements into its narrative, making it a rich text for analysis:

The Ethics of Scientific Discovery

The film prompts viewers to consider the ethical implications of scientific research, particularly in terms of intellectual property and the treatment of collaborators. Key points include:

- Recognition of Contributions: The film raises questions about how scientific achievements are often overshadowed by dominant narratives, particularly the contributions of women.
- Consequences of Ambition: It explores the lengths to which scientists will go to achieve fame and success, sometimes at the expense of their colleagues.

Gender and Science

The portrayal of Rosalind Franklin brings to light the challenges faced by women in the male-dominated field of science. The film addresses:

- Gender Bias: It highlights the systemic barriers that Franklin encountered, illustrating the broader societal issues regarding women in STEM.
- Legacy and Recognition: The film prompts discussions about the need for a more inclusive history of science that acknowledges all contributors.

Discussion Questions

To facilitate deeper engagement with the film, here are some thought-provoking discussion questions:

1. How does the film portray the relationship between Watson and Crick? What does this say about collaboration in science?
2. In what ways does Rosalind Franklin's story resonate with current discussions about women in science?
3. What ethical dilemmas arise from Watson and Crick’s discovery, and how do they reflect broader issues in scientific research?
4. How does the film balance dramatization with historical accuracy? What creative liberties does it take, and why might that be significant?

Conclusion

"Double Helix" is more than just a biopic about the discovery of DNA; it is a compelling narrative that brings to light the complexities of scientific progress, the ethical dilemmas faced by researchers, and the importance of recognizing contributions from diverse voices. Through its exploration of character dynamics, scientific concepts, and thematic depth, the film serves as an engaging catalyst for discussions about science, ethics, and gender representation. Whether used in an educational setting or for personal reflection, the "Double Helix Movie Guide Answers" offer a comprehensive framework to appreciate this pivotal moment in scientific history and its lasting implications.

Frequently Asked Questions

What is the main theme of the Double Helix movie?

The main theme of the Double Helix movie revolves around the complex relationship between science and ethics, particularly in the context of genetic research and the discovery of DNA's structure.

Who are the key characters in the Double Helix movie?

The key characters include James Watson and Francis Crick, who are the main scientists behind the discovery of the DNA double helix structure, along with Rosalind Franklin, whose work was instrumental in their research.

What historical events are depicted in the Double Helix movie?

The movie depicts the events surrounding the race to discover the structure of DNA in the early 1950s, highlighting the competition between various scientists and the collaboration and conflict that arose.

How does the Double Helix movie portray scientific collaboration?

The Double Helix movie portrays scientific collaboration as both a driving force and a source of tension, showcasing how teamwork can lead to groundbreaking discoveries while also revealing the rivalries and ethical dilemmas faced by researchers.

What impact did the Double Helix movie have on

public understanding of genetics?

The Double Helix movie helped to raise awareness about the significance of genetics and DNA research, making complex scientific concepts more accessible to the general public and sparking interest in the field of molecular biology.

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