Name Key Period _____

Ms. Foglia Date _____

AP: CHAPTER 16: THE MOLECULAR BASIS OF INHERITANCE

1. After Morgan and fellow scientists developed the Chromosomal Theory of Inheritance, the search was on for the chemical mechanism of inheritance. What are the two components of the chromosome?

DNA + proteins

2. From initial logic, which component would be the most likely candidate for the genetic material and why?

protein - great heterogeneity and specificity of function

3. What did Griffith, Avery, and others accomplish with bacteria?

They were able to change its pathogeniaty

4. Define transformation. a change in genotype and phenotype due to the assimilation of external DNA by a cell.

5. What did the experiments done by Alfred Hershey and Martha Chase show?

That DNA is the heredity molecule

6. What are Chargaff's rules?

A-T, C-G 1) base composition varies between species, 2) # A & T are equal, # G & C are equal

7. If a species has 35% adenine in its DNA, determine the percent of the other three bases.

35% - T 15% G, 15% C

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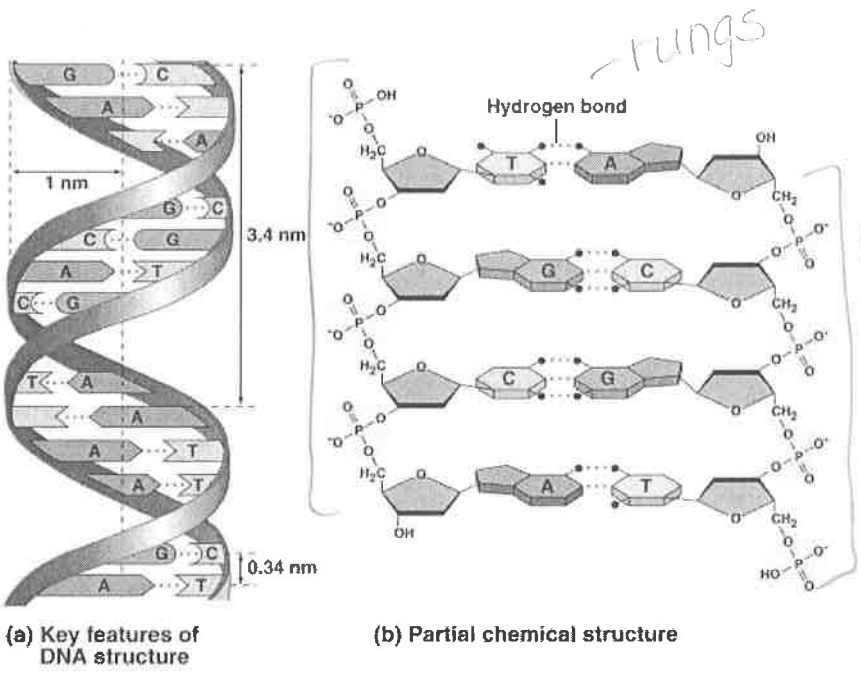
8. What was the role of Maurice Wilkins and Rosalind Franklin in determining the structure of DNA?

determined the helical structure through x-ray crystallography

9. Use the diagram to describe the structure of DNA. Include several comments.



10. What is the advantage of the double stranded aspect of the DNA? allows for semi-conservative replication

11. Which model of DNA replication is accepted? semi-conservative replication

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12. What happens at the DNA replication fork?

DNA is unwound by helicases

13. Make a list of the enzymes involved in replication and their role.

Helicase - unwinding

Topoisomerase - relieve tension of unwinding

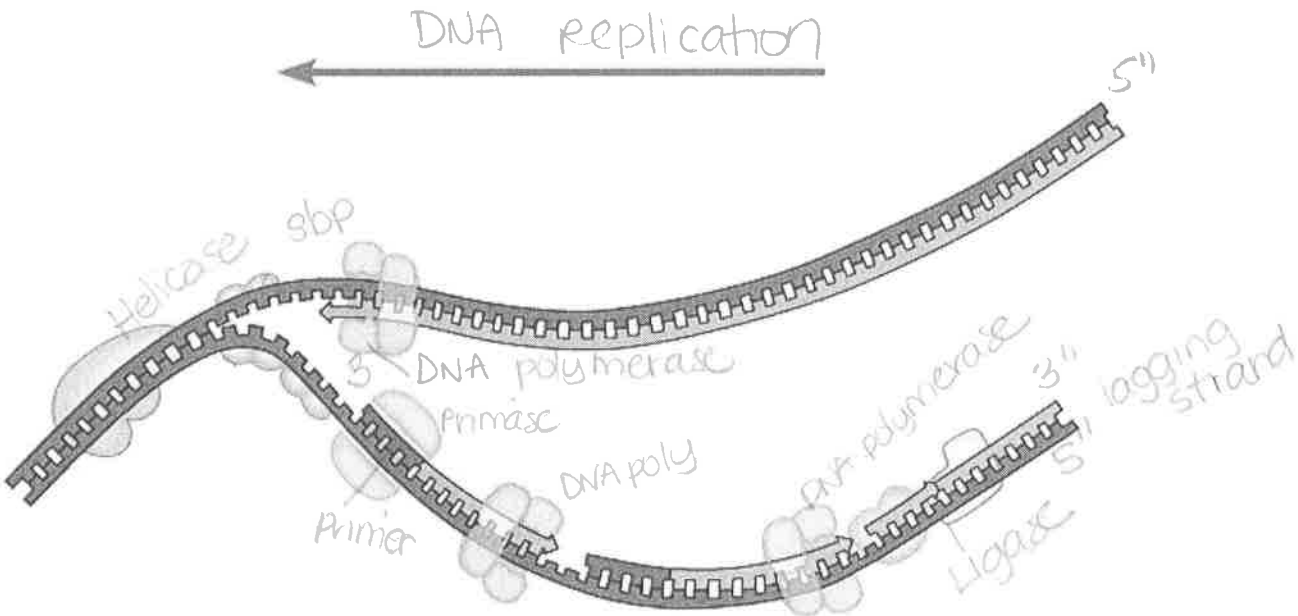
Primase - adds primer

DNA polymerase - adds nucleotides Ligase - joins fragments

14. Why does the DNA have to add nucleotides in the 5' to 3' direction?

Because DNA polymerase can only add nucleotides to the free 3' end of a primer

15. Label the diagram of DNA replication. Include the directions and the terms.



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16. Describe the "priming of the DNA" before replication. Primase forms a 5-10 nucleotide primer which connects to template strand - signals replication from its 3" end

17. List some of the steps involved in DNA repair. DNA polymerase edits, fixing incorrectly paired nucleotides "mismatch repair" - completed by other enzymes if polymerase doesn't catch it

18. What is the problem that occurs at the ends of the chromosome during replication?

Repeated rounds of replication produce shorter & shorter DNA molecules with uneven ends

19. What is a telomere and its role in cell division. buffer at end of eukaryotic DNA, protects genes, prevents staggered ends from activating cell cycle arrest or death

20. Why was there no selection pressure for prokaryotes to evolve a telomere-like solution on their chromosome?

they have circular DNA

21. Why is telomerase an active area in cancer research?

normal shortening telomeres → prevents cancer