

**Chapter 12 DNA and RNA**

**Section 12-1 DNA (pages 287-294)**

*This section tells about the experiments that helped scientists discover the relationship between genes and DNA. It also describes the chemical structure of the DNA molecule.*

**Griffith and Transformation (pages 287-289)**

1. What did Frederick Griffith want to learn about bacteria? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
2. The strain of bacteria that caused pneumonia grew into \_\_\_\_\_ colonies on culture plates; harmless bacteria produced colonies with \_\_\_\_\_ edges.
3. Circle the letter of each sentence that is true about Griffith's experiment.
  - a. Mice injected with bacteria from smooth colonies died.
  - b. Mice injected with bacteria from rough colonies died.
  - c. Mice injected with heat-killed bacteria from smooth colonies died.
  - d. Mice injected with a mixture of bacteria from heat-killed smooth colonies and live rough colonies died.
4. What result from Griffith's experiment suggested that the cause of pneumonia was not a chemical poison released by the disease-causing bacteria? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
5. What is transformation? \_\_\_\_\_  
\_\_\_\_\_
6. What hypothesis did Griffith form from the results of his experiments? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**Avery and DNA (page 289)**

7. Is the following sentence true or false? Avery and his colleagues thought that the molecule required in transformation might also be the molecule of the gene.  
\_\_\_\_\_
8. Briefly describe how Avery and his group determined which molecule was most important for transformation? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Name \_\_\_\_\_ Class \_\_\_\_\_ Date \_\_\_\_\_

9. Transformation did not occur when \_\_\_\_\_ was destroyed.
10. What was the conclusion from Avery's experiments? \_\_\_\_\_
- \_\_\_\_\_

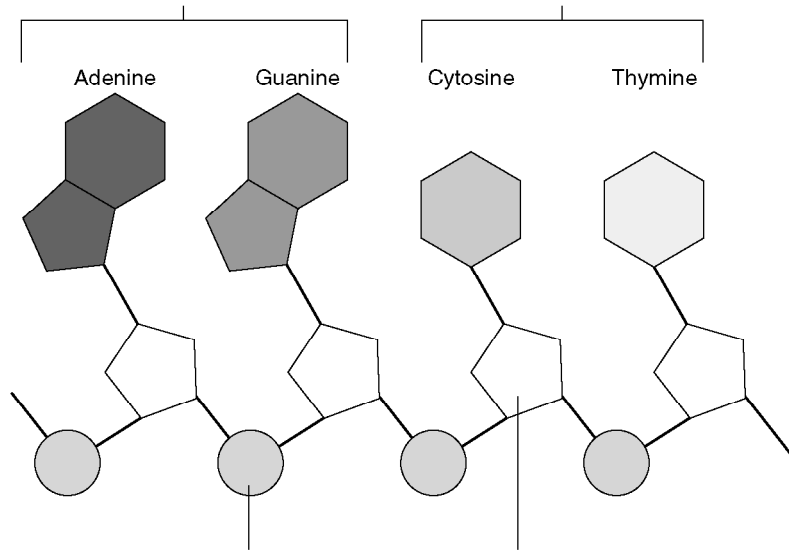
### **The Hershey-Chase Experiment** (pages 289–290)

11. What is a bacteriophage? \_\_\_\_\_
- \_\_\_\_\_
12. Circle the letter of each part that makes up a bacteriophage.
- a. lipid coat                      c. carbohydrate core
- b. protein coat                    d. DNA core
13. What happens when a bacteriophage infects a bacterial cell? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
14. How would Hershey and Chase learn whether genes were made of protein or DNA?
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
15. Circle the letter of the molecule for which phosphorus-32 ( $^{32}\text{P}$ ) is used as a radioactive marker.
- a. protein      b. lipid      c. DNA      d. carbohydrate
16. Is the following sentence true or false? If  $^{35}\text{S}$  was found in the bacteria, it would mean that the viruses' DNA had been injected into the bacteria. \_\_\_\_\_
17. What results did Hershey and Chase observe? \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
18. Hershey and Chase concluded that the genetic material of the bacteriophage was \_\_\_\_\_.

### **The Components and Structure of DNA** (pages 291–294)

19. List the three critical things that genes were known to do.
- a. \_\_\_\_\_
- \_\_\_\_\_
- b. \_\_\_\_\_
- \_\_\_\_\_
- c. \_\_\_\_\_
- \_\_\_\_\_
20. Adenine, guanine, cytosine, and thymine are four kinds of \_\_\_\_\_ bases in DNA.

21. Identify the components of a nucleotide in the diagram below. Label the bases as purines or pyrimidines.



22. Is the following sentence true or false? Adenine and guanine are larger molecules than cytosine and thymine because they have two rings in their structure. \_\_\_\_\_

23. What forms the backbone of a DNA chain? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

24. Is the following sentence true or false? The nucleotides must be joined together in a specific order. \_\_\_\_\_

25. According to Chargaff's rules, the percentages of \_\_\_\_\_ are equal to thymine and the percentages of \_\_\_\_\_ are equal to guanine in the DNA molecule.

26. Rosalind Franklin's work with X-ray diffraction showed that the DNA molecule is shaped like a(an) \_\_\_\_\_ and contains \_\_\_\_\_ strands.

27. How did Francis Crick and James Watson try to understand the structure of DNA?  
 \_\_\_\_\_  
 \_\_\_\_\_

28. How did Watson and Crick describe the structure of DNA? \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

29. Is the following sentence true or false? According to the principle of base pairing, hydrogen bonds could form only between adenine and cytosine. \_\_\_\_\_