

# Ch 12.DNA and RNA.Biology.Landis

Identity \_\_\_\_\_

## 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 hypothesis did Griffith form from the results of his experiments?

### Avery and DNA (page 289)

2. What was the conclusion from Avery's experiments?

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

3. What results did Hershey and Chase observe?

4. Hershey and Chase concluded that the genetic material of the bacteriophage was

### The Structure of DNA (pages 291–294)

5. List the three critical things that genes were known to do.

6. Adenine, guanine, cytosine, and thymine are four kinds of \_\_\_\_\_ bases in DNA.

7. What forms the backbone of a DNA chain?

8. According to Chargaff's rules, the percentages of \_\_\_\_\_ are equal to thymine and

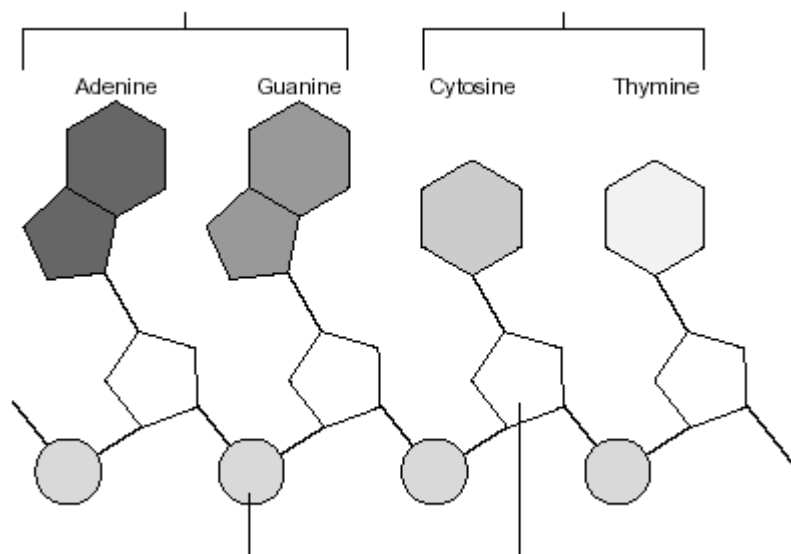
the percentages of \_\_\_\_\_ are equal to guanine in the DNA molecule.

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9. Rosalind Franklin's work with X-ray diffraction showed that the DNA molecule is shaped like a(an)

\_\_\_\_\_ and contains \_\_\_\_\_ strands.

10. Identify the parts of a nucleotide in the diagram below. Label the bases as purines or pyrimidines.



11. How did Watson and Crick describe the structure of DNA?

### Section 12-2 Chromosomes and DNA Replication (pages 295-299)

*This section describes how DNA is packaged to form chromosomes. It also tells how the cell duplicates its DNA before cell division.*

#### DNA and Chromosomes (pages 295-296)

12. Circle the letter of the location of DNA in prokaryotic cells.

- a. nucleus    b. mitochondria    c. cytoplasm    d. vacuole

13. Eukaryotic DNA is generally located in the cell \_\_\_\_\_ in the form of a number of \_\_\_\_\_ chromosomes.

14. Circle the letter of each sentence that is true about chromosome structure.

- a. The DNA in eukaryotic cells is very loosely packed.

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- b. Prokaryotic cells contain more DNA than eukaryotic cells.
- c. A human cell contains more than 1 meter of DNA.
- d. The DNA of the smallest human chromosome is nearly 10 times as long as many bacterial chromosomes.

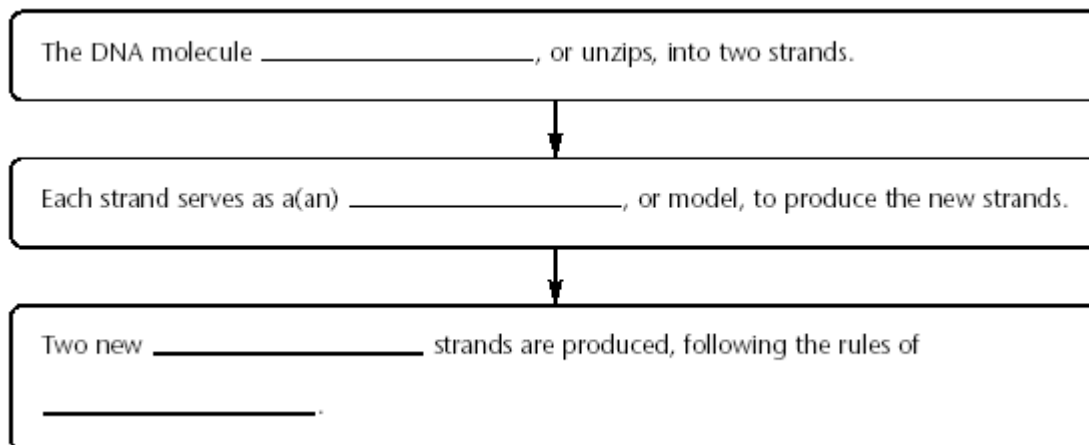
15. What are histones?

16. List two roles of nucleosomes.

### DNA Replication (pages 297-299)

17. What occurs during the process of replication?

18. Complete the flowchart to describe the process of DNA replication.



19. What is the complimentary strand of bases for a strand with the bases TACGTT?

20. Is the following sentence true or false? Each DNA molecule resulting from replication has one original strand and one new strand.

### Section 12-3 RNA and Protein Synthesis (pages 300-306)

*This section describes RNA and its role in transcription and translation.*

#### The Structure of RNA (page 300)

21. List the three main differences between RNA and DNA.

22. What is the importance of the cell's ability to copy a single DNA sequence into RNA?

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### Types of RNA (pages 300-301)

23. What is the one job in which most RNA molecules are involved?

24. Complete the compare-and-contrast table about the types of RNA.

**TYPES OF RNA**

Type	Function
	Carries copies of the instructions for assembling amino acids from DNA to the rest of the cell
Ribosomal RNA	
	Transfers each amino acid to the ribosome to help assemble proteins.

### Transcription (page 301)

25. Circle the letter of each sentence that is true about transcription.

- a. During transcription, DNA polymerase binds to RNA and separates the DNA strands.
- b. RNA polymerase uses one strand of DNA as a template to assemble nucleotides into a strand of RNA.
- c. RNA polymerase binds only to DNA promoters, which have specific base sequences.
- d. Promoters are signals in RNA that indicate to RNA polymerase when to begin

transcription.

### The Genetic Code (pages 302-303)

26. Proteins are made by joining \_\_\_\_\_ into long chains called polypeptides.

27. How can only four bases in RNA carry instructions for 20 different amino acids?

28. What is a codon?

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29. Circle the letter of the number of possible three-base codons.  
a. 4                      b. 12                      c. 64                      d. 128
30. Is the following sentence true or false? All amino acids are specified by only one codon.
31. Circle the letter of the codon that serves as the “start” codon for protein synthesis.  
a. UGA                      b. UAA                      c. UAG                      d. AUG

### Translation (pages 303–305)

32. What occurs during the process of translation?
33. Where does translation occur?
34. Circle the letter of each sentence that is true about translation.  
a. Before translation can occur, messenger RNA must be transcribed from DNA in the nucleus.  
b. Translation occurs in the nucleus.  
c. It is the job of transfer RNA to bring the proper amino acid into the ribosome to be attached to the growing peptide chain.  
d. When the ribosome reaches a stop codon, it releases the newly formed polypeptide and the mRNA molecule.
35. What is an anticodon?

### The Roles of RNA and DNA (page 306)

36. Match the roles with the molecules. Molecules may be used more than once.

Roles	Molecules
Master plan	a. DNA
Goes to the ribosomes in the cytoplasm	b. RNA
Blueprint	
Remains in the nucleus	

### Genes and Proteins (page 306)

37. Many proteins are \_\_\_\_\_, which catalyze and regulate chemical reactions.

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## **Section 12–4 Mutations (pages 307–308)**

*This section describes and compares gene mutations and chromosomal mutations.*

### **Introduction (page 307)**

38. What are mutations?

### **Gene Mutations (pages 307–308)**

39. What is a point mutation?

40. A mutation involving the insertion or deletion of a nucleotide is a(an) \_\_\_\_\_ mutation.

41. Circle the letter of each sentence that is true about gene mutations.

- a. Point mutations affect just one nucleotide.
- b. The substitution of one nucleotide for another in the gene never affects the function of the protein.
- c. Point mutations that involve the insertion or deletion of a nucleotide change the reading frame of the genetic message.
- d. Frameshift mutations affect every amino acid that follows the point of the mutation.

### **Chromosomal Mutations (page 308)**

42. Complete the compare-and-contrast table of types of chromosomal mutations.

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## CHROMOSOMAL MUTATIONS

Type	Description	Examples
		ABC•DEF → AC•DEF
Duplication		
	Part of a chromosome becomes oriented in the reverse of its usual direction	
Translocation		