Name_____ Class_____ Date_____

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)

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

a. _____

b. _____

c. _____

2. Is the following sentence true or false? RNA is like a disposable copy of a DNA segment. _____

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

_____

_____

Types of RNA (pages 300–301)

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

_____

_____

5. 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)

6. 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.

Name_____ Class_____ Date_____

RNA Editing (page 302)

7. Many RNA molecules from eukaryotic genes have sections, called _____, edited out of them before they become functional. The remaining pieces, called _____, are spliced together.
8. Is the following sentence true or false? RNA editing occurs in the cytoplasm of the cell. _____
9. What are two explanations for why some RNA molecules are cut and spliced?
   a. _____
   b. _____

The Genetic Code (pages 302–303)

10. Proteins are made by joining _____ into long chains called polypeptides.
11. How can only four bases in RNA carry instructions for 20 different amino acids?
12. What is a codon? _____
13. Circle the letter of the number of possible three-base codons.
    a. 4 **b.** 12 **c.** 64 **d.** 128
14. Is the following sentence true or false? All amino acids are specified by only one codon. _____
15. 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)

16. What occurs during the process of translation? _____
17. Where does translation take place? _____

Name _____ Class _____ Date _____

18. Circle the letter of each sentence that is true about translation.

a. Before translation occurs, messenger RNA is 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.

19. What is an anticodon? _____

_____

_____

The Roles of RNA and DNA (page 306)

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

Roles	Molecules
_____ **20.** Master plan	**a.** DNA
_____ **21.** Goes to the ribosomes in the cytoplasm	**b.** RNA
_____ **22.** Blueprint	
_____ **23.** Remains in the nucleus	

Genes and Proteins (page 306)

24. Many proteins are _____, which catalyze and regulate chemical reactions.

25. Is the following sentence true or false? Genes are the keys to almost everything that living cells do. _____

Reading Skill Practice

A flowchart is useful for organizing the steps in a process. Make a flowchart that shows the steps in the process of translation. Look at Figure 12–18 on pages 304–305 for help. For more information about flowcharts, see Appendix A. Do your work on a separate sheet of paper.