

Directed Reading A *continued*

12. List two examples of things proteins help determine about you.

13. Several forms of RNA or _____ help change DNA code into proteins.

14. Because it is so similar to _____, RNA can serve as a temporary copy of a DNA sequence.

15. The “factory” that assembles proteins is known as a(n) _____.

16. A mirror-like copy of DNA called _____ moves from the nucleus to the ribosome.

17. Another form of RNA called _____ matches amino acids with the bases on the messenger RNA.

Put the following steps in making a protein in order by putting a number in the space provided: 1 for step 1, 2 for step 2, etc.

_____ **18.** The RNA copy is fed through the ribosome.

_____ **19.** Transfer RNA molecules deliver amino acids to the ribosome.

_____ **20.** Transfer RNA molecules pick up amino acids from the cytoplasm.

_____ **21.** The amino acids are joined to make a protein.

_____ **22.** A mirrorlike copy of the gene is made of RNA.

Directed Reading A *continued*

CHANGES IN GENES

23. Changes in the number, type, or order of bases on a piece of DNA are known as _____.

Match the correct definition with the correct term. Write the letter in the space provided.

- | | |
|---|------------------------|
| _____ 24. A base pair is added. | a. substitution |
| _____ 25. A base pair is replaced. | b. insertion |
| _____ 26. A base pair is removed. | c. deletion |

27. Physical or chemical agents known as _____ can cause mutations in DNA.

28. List two examples of mutagens.

AN EXAMPLE OF A SUBSTITUTION

- _____ **29.** Sickle cell disease is caused by a(n)
- | | |
|----------------------------------|----------------------------------|
| a. substitution mutation. | c. insertion mutation. |
| b. deletion mutation. | d. blood vessel mutation. |

USES OF GENETIC KNOWLEDGE

- _____ **30.** The manipulation of individual genes within organisms by scientists is called
- | | |
|-----------------------------|--------------------------------|
| a. mutation. | c. genetic property. |
| b. drug enhancement. | d. genetic engineering. |

31. List two possible uses of genetic engineering.

32. Because DNA is unique, DNA _____ can identify the unique patterns in an individual's DNA and help solve crimes.

33. Only identical twins have truly identical _____.

34. A scientifically created organism that has an exact copy of another organism's genes is a(n) _____.

Section Review

How DNA Works

USING KEY TERMS

1. Use each of the following terms in the same sentence: *ribosome* and *RNA*.

2. In your own words, write a definition for the term *mutation*.

UNDERSTANDING KEY IDEAS

3. Explain the relationship between genes and proteins.

4. List three possible types of mutations.

- _____ 5. Which type of mutation causes sickle cell anemia?

a. substitution

c. deletion

b. insertion

d. mutagen

MATH SKILLS

6. A set of 23 chromosomes in a human cell contains 3.2 billion pairs of DNA bases in sequence. How many pairs of bases are in each chromosome? Show your work below.

Section Review *continued*

CRITICAL THINKING

7. Applying Concepts In which cell type might a mutation be passed from generation to generation? Explain.

8. Making Comparisons How is genetic engineering different from natural reproduction?

INTERPRETING GRAPHICS

The illustration below shows a sequence of bases on one strand of a DNA molecule. Use the illustration below to answer the questions that follow.



9. How many amino acids are coded for by the sequence on one side (A) of this DNA strand?

10. What is the order of bases on the complementary side of the strand (B), from left to right?

11. If a G were inserted as the first base on the top side (A), what would the order of bases be on the complementary side (B)?
