

Chapter 14, The Human Genome (continued)

Section 14–3 Human Molecular Genetics (pages 355–360)

This section explains how genetic engineering techniques are being used to study the genes and chromosomes in the human genome. It also describes how this information is used for gene therapy.

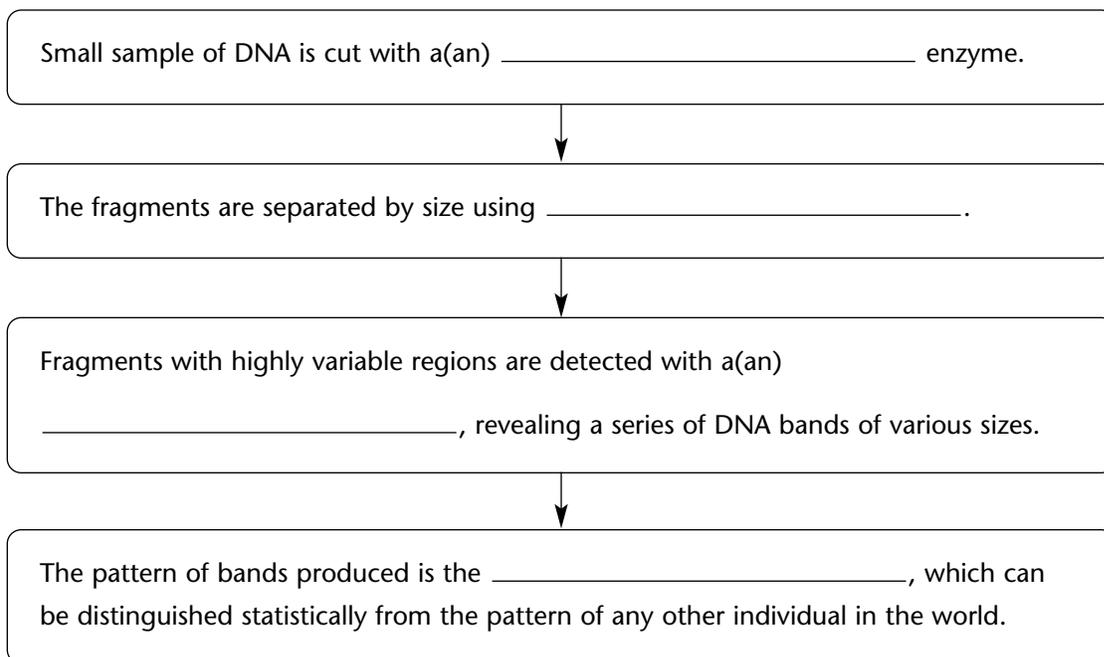
Human DNA Analysis (pages 355–357)

1. Biologists search the volumes of the human genome using _____.
2. Why might prospective parents decide to have genetic testing? _____

3. Circle the letter of each sentence that is true about genetic testing.
 - a. It is impossible to test parents to find out if they are carriers for cystic fibrosis or Tay-Sachs disease.
 - b. Labeled DNA probes can be used to detect specific sequences found in disease-causing alleles.
 - c. Some genetic tests use changes in restriction enzyme cutting sites to identify disease-causing alleles.
 - d. DNA testing makes it possible to develop more effective therapy and treatment for individuals affected by genetic disease.

4. What is DNA fingerprinting? _____

5. Complete the flowchart to show the steps in DNA fingerprinting.



Name _____ Class _____ Date _____

6. Circle the letter of each source for a DNA sample from an individual.
- a. blood
 - b. sperm
 - c. clothing
 - d. hair with tissue at the base
7. Is the following sentence true or false? DNA evidence is not reliable enough to be used to convict criminals. _____

The Human Genome Project (pages 357–358)

8. What is the Human Genome Project? _____

9. Circle the letter of each sentence that is true about the Human Genome Project.
- a. The human genome is the first genome entirely sequenced.
 - b. The human genome is about the same size as the genome of *E. coli*.
 - c. Researchers completed the genomes of yeast and fruit flies during the same time they sequenced the human genome.
 - d. A working copy of the human genome was completed in June 2000.
10. What were the three major steps in the process of sequencing the human genome?
- a. _____

 - b. _____

 - c. _____

11. What is an open reading frame, and what is it used for? _____

12. The mRNA coding regions of most genes are interrupted by _____.
13. List three other parts of the gene that researchers look for.
- a. _____
 - b. _____
 - c. _____
14. Why are biotechnology companies interested in genetic information? _____

Chapter 14, The Human Genome *(continued)*

15. Is the following sentence true or false? Human genome data is top secret and can be accessed only by certain people. _____

Gene Therapy (pages 359–360)

16. What is gene therapy? _____

17. Circle the letter of each sentence that is true about gene therapy.

- a. When the normal copy of the gene is inserted, the body can make the correct protein, which eliminates the disorder.
- b. So far, no one has been successfully cured of a genetic disorder using gene therapy.
- c. Viruses are often used to carry the normal genes into cells.
- d. Viruses used in gene therapy often cause disease in the patients.

18. Have all gene therapy experiments been successful? Explain. _____

Ethical Issues in Human Genetics (page 360)

19. What other changes could be made to the human genome by manipulating human cells? _____

20. What is the goal of biology? _____

21. What is the responsibility of society in biology? _____

22. Is the following true or false? Scientists should be expected to make all ethical decisions regarding advances in human genetics. _____

WordWise

Use the clues to fill in the blanks with vocabulary terms from Chapter 14.
Then, put the numbered letters in the correct spaces to find the hidden message.

Clues

Vocabulary Terms

Occurs when homologous chromosomes fail to separate during meiosis
 _____ 1 _____ 2 _____ 3 _____ 4 _____ 5

Describes a trait that is controlled by many genes
 _____ 6 _____ 7 _____ 8

In humans, Y is a sex _____.
 _____ 9 _____ 10 _____ 11 _____ 12

Technique that uses DNA to identify individuals
 _____ 13 _____ 14 _____ 15 _____ 16 _____ 17 _____ 18 _____

Chart that shows the relationships within a family
 _____ 19 _____ 20 _____ 21

A picture of chromosomes arranged in pairs
 _____ 22 _____ 23 _____ 24 _____ 25

A gene located on the X or Y chromosome is a _____ gene.
 _____ 26 _____ 27 _____ 28 _____ 29 _____

Chromosomes that are not sex chromosomes
 _____ 30 _____ 31 _____ 32 _____ 33

Hidden Message:

_____ 4 _____ 10 _____ 30 _____ 28 _____ 20 _____ 32 _____ 33 _____ 16 _____ 5 _____ 13 _____ 14 _____ 15

_____ 8 _____ 22 _____ 3 _____ 26 _____ 21 _____ 7 _____ 25 _____ 1 _____ 12 _____ 24 _____ 18 _____ 9

_____ 19 _____ 27 _____ 31 _____ 6 _____ 17 _____ 2 _____ 29 _____ 23 _____ 11 _____