Answer Key

Directed Reading A

SECTION:WHAT DOES DNA LOOK LIKE?

1. D
2. A
3. B
4. give instructions for building and maintaining cells and be able to be copied each time a cell divides
5. so that each cell contains an identical set of genes
6. complex
7. a sugar, a phosphate, and a base
8. adenine, thymine, guanine, cytosine
9. A, T, G, C
10. adenine
11. cytosine
12. X-ray diffraction
13. spiral
14. a long, twisted ladder
15. how DNA is copied and how it functions in the cell
16. double helix
17. alternating sugar and phosphate molecules
18. a pair of bases
19. B
20. A
21. The matching bases are always present in equal amounts.
22. replicate
23. complementary
24. down the middle
25. complementary nucleotides
26. every time a cell divides
27. proteins

SECTION:HOW DNA WORKS

1. about 2 m
2. A
3. C
4. gene
5. 46
6. 2
7. DNA
8. bases
9. amino acids
10. protein
11. gene
12. Answers may vary. Sample answer: Proteins determine how tall you are, what colors you see, and whether your hair is curly or straight.
13. ribonucleic acid
14. DNA
15. ribosome
16. messenger RNA
17. transfer RNA
18. 2
19. 4
20. 3
21. 5
22. 1
23. mutations
24. B
25. A
26. C
27. mutagens
28. Answers may vary. Sample answers: high-energy radiation from Xrays, ultraviolet radiation from sunlight, asbestos, chemicals in cigarette smoke
29. A
30. D
31. Answers may vary. Sample answers: curing diseases, creating new drugs, new foods, or new fabrics
32. fingerprinting
33. DNA
34. clone

Directed Reading B

SECTION:WHAT DOES DNA LOOK LIKE?

1. B
2. A
3. C
4. A
5. C
6. nucleotide
7. base
8. thymine
9. cytosine
10. B
11. B
12. C

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13. double helix
14. bases
15. cytosine
16. thymine
17. C
18. A
19. C
20. D
21. A

SECTION:HOW DNA WORKS

1. C
2. B
3. D
4. C
5. D
6. A
7. D
8. B
9. messenger RNA
10. ribosome
11. transfer RNA
12. D
13. deletion
14. insertion
15. substitution
16. C
17. C
18. B
19. C
20. B
21. B
22. C
23. A
24. C

Vocabulary and Section Summary

SECTION:WHAT DOES DNA LOOK LIKE?

1. DNA: deoxyribonucleic acid, a molecule that is present in all living cells and that contains the information that determines the traits that a living thing inherits and needs to live
2. nucleotide: in a nucleic-acid chain, a subunit that consists of a sugar, a phosphate, and a nitrogenous base

SECTION:HOW DNA WORKS

1. RNA: ribonucleic acid, a molecule that is present in all living cells and that plays a role in protein production
2. ribosome: a cell organelle composed of RNA and protein; the site of protein synthesis
3. mutation: a change in the nucleotide-base sequence of a gene or DNA molecule

Section Review

SECTION:WHAT DOES DNA LOOK LIKE?

1. Sample answer: DNA is the material that makes up genes and is found in all cells.
2. Sample answer: A nucleotide is a subunit of a DNA molecule and consists of a sugar, a phosphate, and a base; there are four kinds of bases and thus four kinds of nucleotides.
3. Sample answers: Scientists thought only complex materials such as proteins could make up genes; Erwin Chargaff discovered the rules of nucleotide base pairing; Rosalind Franklin made images of DNA molecules; Watson and Crick made a correct model of DNA's structure.
4. C
5. 20% guanine, because it should be equal to the amount of cytosine; 30% adenine, because the remaining 60% of the DNA should be made up of equal amounts of adenine and thymine
6. Sample answer: DNA is found in the cells of all organisms.
7. GAATCCGAATGGT
8. DNA copies are made by splitting the molecule down the middle and then adding new nucleotides to each side. (Students' drawings should resemble Figure 5.)

SECTION: HOW DNA WORKS

1. Sample answer: A ribosome is made of RNA and protein.
2. Sample answer: A mutation is a mistake in the DNA code.
3. Genes are sequences of DNA that code for particular proteins.
4. substitution, insertion, deletion
5. A
6. About 139 million (3,200,000,000 23 139,130,435)

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