

Brief Contents

- 1 Biology and Its Themes 48

UNIT 1 THE ROLE OF CHEMISTRY IN BIOLOGY 75

- 2 Atoms and Molecules 78
3 The Chemistry of Water 94
4 Carbon: The Basis of Molecular Diversity 106
5 Biological Macromolecules and Lipids 116
6 Energy and Life 143

UNIT 2 CELL BIOLOGY 164

- 7 Cell Structure and Function 167
8 Cell Membranes 198
9 Cellular Signaling 216
10 Cell Respiration 238
11 Photosynthetic Processes 261
12 Mitosis 286

UNIT 3 THE GENETIC BASIS OF LIFE 305

- 13 Sexual Life Cycles and Meiosis 308
14 Mendelian Genetics 323
15 Linkage and Chromosomes 348
16 Nucleic Acids and Inheritance 368
17 Expression of Genes 389
18 Control of Gene Expression 416
19 DNA Technology 448
20 The Evolution of Genomes 476

UNIT 4 EVOLUTION 501

- 21 How Evolution Works 504
22 Phylogenetic Reconstruction 523
23 Microevolution 544
24 Species and Speciation 564
25 Macroevolution 583

UNIT 5 THE DIVERSITY OF LIFE 610

- 26 Introduction to Viruses 612
27 Prokaryotes 629
28 The Origin and Evolution of Eukaryotes 649

- 29 Nonvascular and Seedless Vascular Plants 674
30 Seed Plants 692
31 Introduction to Fungi 710
32 An Introduction to Animal Diversity 729
33 Invertebrates 742
34 Vertebrates 774

UNIT 6 PLANTS: STRUCTURE AND FUNCTION 813

- 35 Plant Structure and Growth 816
36 Transport in Vascular Plants 842
37 Plant Nutrition 863
38 Reproduction of Flowering Plants 879
39 Plant Signals and Behavior 900

UNIT 7 ANIMALS: STRUCTURE AND FUNCTION 930

- 40 The Animal Body 933
41 Chemical Signals in Animals 958
42 Animal Digestive Systems 978
43 Animal Transport Systems 1001
44 Animal Excretory Systems 1033
45 Animal Reproductive Systems 1055
46 Development in Animals 1079
47 Animal Defenses Against Infection 1104
48 Electrical Signals in Animals 1129
49 Neural Regulation in Animals 1147
50 Sensation and Movement in Animals 1169

UNIT 8 THE ECOLOGY OF LIFE 1201

- 51 An Overview of Ecology 1204
52 Behavioral Ecology 1231
53 Populations and Life History Traits 1256
54 Biodiversity and Communities 1280
55 Energy Flow and Chemical Cycling in Ecosystems 1304
56 Conservation and Global Ecology 1326