

Brief Contents

1 Exploring Life 2

UNIT ONE The Chemistry of Life

- 2 The Chemical Context of Life 32
- 3 Water and the Fitness of the Environment 47
- 4 Carbon and the Molecular Diversity of Life 58
- 5 The Structure and Function of Macromolecules 68

UNIT TWO The Cell

- 6 A Tour of the Cell 94
- 7 Membrane Structure and Function 124
- 8 An Introduction to Metabolism 141
- 9 Cellular Respiration: Harvesting Chemical Energy 160
- 10 Photosynthesis 181
- 11 Cell Communication 201
- 12 The Cell Cycle 218

UNIT THREE Genetics

- 13 Meiosis and Sexual Life Cycles 238
- 14 Mendel and the Gene Idea 251
- 15 The Chromosomal Basis of Inheritance 274
- 16 The Molecular Basis of Inheritance 293
- 17 From Gene to Protein 309
- 18 The Genetics of Viruses and Bacteria 334
- 19 Eukaryotic Genomes: Organization, Regulation, and Evolution 359
- 20 DNA Technology and Genomics 384
- 21 The Genetic Basis of Development 411

UNIT FOUR Mechanisms of Evolution

- 22 Descent with Modification: A Darwinian View of Life 438
- 23 The Evolution of Populations 454
- 24 The Origin of Species 472
- 25 Phylogeny and Systematics 491

UNIT FIVE The Evolutionary History of Biological Diversity

- 26 The Tree of Life: An Introduction to Biological Diversity 512

27 Prokaryotes 534

28 Protists 549

29 Plant Diversity I: How Plants Colonized Land 573

30 Plant Diversity II: The Evolution of Seed Plants 591

31 Fungi 608

32 An Introduction to Animal Diversity 626

33 Invertebrates 638

34 Vertebrates 671

UNIT SIX Plant Form and Function

- 35 Plant Structure, Growth, and Development 712
- 36 Transport in Vascular Plants 738
- 37 Plant Nutrition 756
- 38 Angiosperm Reproduction and Biotechnology 771
- 39 Plant Responses to Internal and External Signals 788

UNIT SEVEN Animal Form and Function

- 40 Basic Principles of Animal Form and Function 820
- 41 Animal Nutrition 844
- 42 Circulation and Gas Exchange 867
- 43 The Immune System 898
- 44 Osmoregulation and Excretion 922
- 45 Hormones and the Endocrine System 943
- 46 Animal Reproduction 964
- 47 Animal Development 987
- 48 Nervous Systems 1011
- 49 Sensory and Motor Mechanisms 1045

UNIT EIGHT Ecology

- 50 An Introduction to Ecology and the Biosphere 1080
- 51 Behavioral Ecology 1106
- 52 Population Ecology 1136
- 53 Community Ecology 1159
- 54 Ecosystems 1184
- 55 Conservation Biology and Restoration Ecology 1209