

- 1** Introduction to Biological Concepts and Research 1

Unit One Molecules and Cells

- 2** Life, Chemistry, and Water 22
- 3** Biological Molecules: The Carbon Compounds of Life 42
- 4** Energy, Enzymes, and Biological Reactions 71
- 5** The Cell: An Overview 90
- 6** Membranes and Transport 119
- 7** Cell Communication 141
- 8** Harvesting Chemical Energy: Cellular Respiration 161
- 9** Photosynthesis 182
- 10** Cell Division and Mitosis 205

Unit Two Genetics

- 11** Meiosis: The Cellular Basis of Sexual Reproduction 225
- 12** Mendel, Genes, and Inheritance 239
- 13** Genes, Chromosomes, and Human Genetics 261
- 14** DNA Structure, Replication, and Organization 286
- 15** From DNA to Protein 310
- 16** Regulation of Gene Expression 339
- 17** Bacterial and Viral Genetics 369
- 18** DNA Technologies: Analyzing and Modifying Genes 391
- 19** Genomes and Proteomes 416

Unit Three Evolutionary Biology

- 20** Development of Evolutionary Thought 439
- 21** Microevolution: Genetic Changes within Populations 456
- 22** Speciation 480
- 23** Paleobiology and Macroevolution 499
- 24** Systematics and Phylogenetics: Revealing the Tree of Life 528

Unit Four Biodiversity

- 25** The Origin of Life 553
- 26** Prokaryotes: Bacteria and Archaea 567
- 27** Protists 587
- 28** Seedless Plants 611

- 29** Seed Plants 630
- 30** Fungi 649
- 31** Animal Phylogeny, Acoelomates, and Protostomes 670
- 32** Deuterostomes: Vertebrates and Their Closest Relatives 706

Unit Five Plant Structure and Function

- 33** The Plant Body 748
- 34** Transport in Plants 774
- 35** Plant Nutrition 793
- 36** Reproduction and Development in Flowering Plants 811
- 37** Plant Signals and Responses to the Environment 838

Unit Six Animal Structure and Function

- 38** Introduction to Animal Organization and Physiology 867
- 39** Information Flow and the Neuron 883
- 40** Nervous Systems 903
- 41** Sensory Systems 921
- 42** The Endocrine System 943
- 43** Muscles, Bones, and Body Movements 966
- 44** The Circulatory System 981
- 45** Defenses against Disease 1002
- 46** Gas Exchange: The Respiratory System 1024
- 47** Animal Nutrition 1043
- 48** Regulating the Internal Environment 1069
- 49** Animal Reproduction 1096
- 50** Animal Development 1118

Unit Seven Ecology and Behavior

- 51** Ecology and the Biosphere 1145
- 52** Population Ecology 1172
- 53** Population Interactions and Community Ecology 1199
- 54** Ecosystems 1229
- 55** Biodiversity and Conservation Biology 1254
- 56** Animal Behavior 1278

Appendix A: Answers A-1

Appendix B: Classification System A-36

Glossary G-1

Index I-1