

# Brief Contents

## Section A. General Principles

### *Part I The Origin of Living Things 1*

- 1 The Science of Biology 3
- 2 The Nature of Molecules 19
- 3 The Chemical Building Blocks of Life 35
- 4 The Origin and Early History of Life 59

### *Part II Biology of the Cell 75*

- 5 Cell Structure 77
- 6 Membranes 103
- 7 Cell-Cell Interactions 123

### *Part III Energetics 141*

- 8 Energy and Metabolism 143
- 9 How Cells Harvest Energy 159
- 10 Photosynthesis 183

### *Part IV Reproduction and Heredity 205*

- 11 How Cells Divide 207
- 12 Sexual Reproduction and Meiosis 225
- 13 Patterns of Inheritance 239

### *Part V Molecular Genetics 277*

- 14 DNA: The Genetic Material 279
- 15 Genes and How They Work 299
- 16 Control of Gene Expression 313
- 17 Cellular Mechanisms of Development 331
- 18 Altering the Genetic Message 361
- 19 Gene Technology 389

### *Part VI Evolution 419*

- 20 Genes within Populations 421
- 21 The Evidence for Evolution 439
- 22 The Origin of Species 457
- 23 How Humans Evolved 477

### *Part VII Ecology and Behavior 493*

- 24 Population Ecology 495
- 25 Community Ecology 515
- 26 Animal Behavior 533
- 27 Behavioral Ecology 553

### *Part VIII The Global Environment 569*

- 28 Dynamics of Ecosystems 571
- 29 The Biosphere 591
- 30 The Future of the Biosphere 611
- 31 Conservation Biology 625

## Section B. Organismal Biology

### *Part IX Viruses and Simple Organisms 647*

- 32 How We Classify Organisms 649
- 33 Viruses 665
- 34 Bacteria 679
- 35 Protists 693
- 36 Fungi 719

### *Part X Plant Form and Function 733*

- 37 Evolutionary History of Plants 735
- 38 The Plant Body 753
- 39 Nutrition and Transport in Plants 777

### *Part XI Plant Growth and Reproduction 793*

- 40 Early Plant Development 795
- 41 How Plants Grow in Response to Their Environment 807
- 42 Plant Reproduction 837
- 43 Plant Genomics 853

### *Part XII Animal Diversity 873*

- 44 The Noncoelomate Animals 875
- 45 Mollusks and Annelids 899
- 46 Arthropods 913
- 47 Echinoderms 933
- 48 Vertebrates 945

### *Part XIII Animal Form and Function 981*

- 49 Organization of the Animal Body 983
- 50 Locomotion 999
- 51 Fueling Body Activities: Digestion 1017
- 52 Circulation 1037
- 53 Respiration 1053

### *Part XIV Regulating the Animal Body 1071*

- 54 The Nervous System 1073
- 55 Sensory Systems 1103
- 56 The Endocrine System 1125
- 57 The Immune System 1147
- 58 Maintaining the Internal Environment 1173
- 59 Sex and Reproduction 1195
- 60 Vertebrate Development 1215

Appendix A-1

Glossary G-1

Credits C-1

Index I-1