

Contents

<i>Preface</i>	<i>v</i>
<i>Thematic Outline</i>	<i>xiii</i>
<i>For Your Reference</i>	<i>xxi</i>
<i>List of Contributors</i>	<i>xxvii</i>

Volume 1

A

Adaptation	1
Adrenal Gland	3
Aging, Biology of	5
Agriculture	9
AIDS	14
Alcohol and Health	18
Algae	21
Allergies	23
Alternation of Generations	25
Amino Acid	27
Amniotic Egg	28
Amphibian	29
Anabolic Steroids	31
Anatomical Terminology	33
Anatomy of Plants	36
Angiosperms	39
Animalia	43
Annelid	45
Antibodies in Research	47
Antibody	49
Antisense Oligonucleotides	52
Apoptosis	53
Arachnid	55

Archaea	56
Arthropod	60
Asymmetric Cell Division	61
Autoimmune Disease	62

B

Bacterial Cell	65
Bacterial Diseases	69
Bacterial Genetics	71
Bacterial Viruses	75
Behavior, Genetic Basis of	77
Behavioral Ecology	81
Biodiversity	86
Biogeochemical Cycles	88
Biogeography	90
Bioinformatics	93
Biological Weapons	96
Biology	98
Biology of Race	99
Biome	102
Biotechnology	103
Bird	105
Birth Control	107
BLAST	109
Blood	110
Blood Clotting	112
Blood Sugar Regulation	114
Blood Vessels	117
Body Cavities	119
Bone	121
Bony Fish	124

Brain	125
<i>BRCA1/BRCA2</i>	133
Bryophytes	134
Buffon, Count (Georges-Louis Leclerc)	137

C

C4 and CAM Plants	139
Cambrian Explosion	140
Cancer	142
Cancer Immunotherapy	146
Carbohydrates	147
Carbon Cycle	149
Cardiovascular Diseases	150
Careers in Biology	152
Careers in Environmental Science	161
Careers in Medicine	165
Carson, Rachel	177
Cartilaginous Fish	178
Cell	180
Cell Culture	183
Cell Cycle	185
Cell Evolution	188
Cell Junctions	191
Cell Motility	193
Cell Signaling	195
Cell Wall	197
Central Nervous System	199
Chemoreception	200
Chloroplast	202

Chordata.	204
Chromosome, Eukaryotic	205
Chromosome Aberrations	213
Circulatory Systems.	217
Cladogram	220
Clinical Trials	221
Clone	222
Cnidaria	225
Coevolution	226
Community Ecology	227
Competition	233
Conifers	235
Connective Tissue.	238
Conservation.	239
Control Mechanisms of Enzyme Activity	244
Control of Gene Expression.	249
Convergent Evolution	257
Coral Reef.	259
Creationism	261
Crick, Francis	263
CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats).	264
Crocodylians	266
Crustacean	267
Cyanobacteria	268
Cytokinesis	270
Cytoskeleton	272
D	
Darwin, Charles	279
De Saussure, Nicolas-Théodore	281
Desert.	282
Desertification.	285
Development	287
Differentiation in Plants.	295

Digestion	301
Digestive System	303
Disease	305
DNA	306
DNA Sequencing	310
DNA Viruses	313
Drug Testing	315
Dubos, René	317
<i>Glossary</i>	319

Volume 2

E

Echinoderm	1
Ecology.	3
Ecology, History of	5
Ecosystem and Conservation	
Ecology.	8
Ecosystem Services	13
Edwards, Robert	15
Electron Microscopy	16
Electrophoresis	18
Encapsulated Cell Therapy.	21
Endangered Species	23
Endocrine System	26
Endocytosis.	31
Endoplasmic Reticulum.	34
Entomologist.	36
Environmental Health	37
Enzymes	39
Epigenetics	46
Epithelium	48
Estuaries	49
Ethnobotany.	52
Eubacteria.	53
Eudicots	56
Evolution	57

Evolution, Evidence for	67
Evolution of Plants	70
Excretory Systems	76
Exocytosis	79
Extinction	81
Extracellular Matrix	86
Extreme Communities	88
Eye	91

F

Feeding Strategies	95
Female Reproductive System	98
Fermentation	104
Fetal Development, Human . . .	105
Fetal Testing (CVS, Amnio, Cell-Free DNA Testing) . . .	111
Field Studies in Animal Behavior	113
Field Studies in Plant Ecology	115
Fire Ecology	117
Flight	121
Flowers	122
Fluorescent Protein Technology	125
Forensic DNA Analysis	126
Forester	129
Forests	130
Fossils	139
<i>FOXP2</i>	142
Franklin, Rosalind	143
Fruits	144
Fungal Diseases	147
Fungi	148
G	
Gas Exchange	155
Gene	158

Gene Therapy	167
Genetic Analysis	169
Genetic Code	173
Genetic Control of Development	176
Genetic Diseases	181
Genetically Modified Organisms (GMOs)	186
Genetics of Cancer Cells	189
Genome	192
Genome-Wide Association Studies	194
Genomic Library – cDNA	195
Genomics	197
Global Climate Change	202
Glycolysis	206
Golgi	208
Grain	211
Grasses	213
Grassland	215
Gray, Asa	217
Growth	218
Gurdon, John	221
Gymnosperms	223

H

Habitat	227
Habitat Fragmentation and Habitat Corridors	227
Hardy-Weinberg Equilibrium	229
Harvey, William	232
Health	233
Hearing	236
Heart and Circulation	239
HeLa Cells	243
Herbal Medicine	245

Herbivory and Plant Defenses	247
History of Biology: Biochemistry	249
History of Biology: Cell Theory and Cell Structure	253
History of Biology: Inheritance	257
History of Evolutionary Thought	261
History of Medicine	266
History of Plant Physiology	268
Homeostasis	272
Hormones	275
Hormones, Plant	277
Human Evolution	281
Human Genome Project	285
Human Microbiome Project	290
Human Nutrition	292
Human Population	294
Hybridization	295
Hybridization, Plant	297
Hypothalamus	298

I

Imaging in Medicine	303
Immune Response	306
Indicator Species	310
Ingenhousz, Jan	311
Insect	312
Invasive Species	315
Ion Channels	318
iPSCs (Induced Pluripotent Stem Cells)	321

K

Kidney	325
Kingdom	327

Krebs Cycle	328
Glossary	331

Volume 3

L

Lakes and Ponds	1
Lamarck, Jean-Baptiste	4
Landscape Ecology	5
Leakey Family	7
Leaves	8
Leeuwenhoek, Antony van	11
Lichen	12
Life Cycle, Human	13
Life Cycles	17
Life, What Is	20
Light Microscopy	22
Linkage and Gene Mapping	25
Linnaeus, Carolus	31
Lipids	31
Liver	34
Locomotion	35
Lymphatic System	37
Lysosomes	40

M

Male Reproductive System	43
Mammal	46
Marshall, Barry	48
Mating Systems	49
McClintock, Barbara	51
Meiosis	52
Membrane Proteins	57
Membrane Structure	60
Membrane Transport	65
Mendel, Gregor	69
Meristems	70

Contents

Metabolism, Cellular	74
Metabolism, Human	77
Metagenomics	80
Microbiota	82
Microclimate and Macroclimate, Climograph	84
Migration	86
Mimicry, Camouflage, and Warning Coloration	88
Mitochondrion	89
Mitosis	94
Model Organisms: Cell Biology and Genetics	97
Model Organisms: Physiology and Medicine	100
Mollusk	103
Monocots	104
Multigene Families	106
Muscle	107
Musculoskeletal System	112
Mutation	115
Mycorrhizae	120
N	
Natural Selection	123
Nematode	127
Nervous Systems	128
Neurologic Diseases	133
Neuron	135
Nitrogen Cycle	140
Nitrogen Fixation	142
Non-Coding RNA, RNAi, Dicer, siRNA	144
Nonspecific Defense	145
Nuclear Transport	148
Nucleolus	150
Nucleotides	152
Nucleus	155

x

O

Ocean Ecosystems	159
Organ	164
Organelle	165
Organic Agriculture	166
Origin of Life	168
Osmoregulation	173
Oxidative Phosphorylation	176

P

Pain	181
Paleontology	183
Pancreas	185
Parasitic Diseases	187
Pasteur, Louis	189
Patterns of Inheritance	191
Pauling, Linus	199
Pedigrees and Modes of Inheritance	200
Peripheral Nervous System	203
Peroxisomes	205
Personalized Medicine	206
Pheromone	207
Photoperiodism	209
Photosynthesis	211
Physiological Ecology	216
Pituitary Gland	219
Plankton	221
Plant	222
Plant Development	224
Plant Nutrition	231
Plant Pathogens and Pests	234
Plasma Membrane	237
Platyhelminthes	240
Poisonous Plants	241
Poisons	243
Pollination and Fertilization	246

Pollution and Bioremediation	248
Polymerase Chain Reaction	252
Population Ecology	254
Population Genetics	257
Porifera	262
Porter, Keith	263
Predation and Defense	263
Primate	266
Prion	268
Probability in Genetics	270
Propagation	271
Protein Structure	272
Protein Synthesis	279
Protein Targeting	286
Protista	288
Protozoa	291
Protozoan Diseases	295
Pseudogenes	297
Psychiatric Disorders, Biology of	299
Psychoactive Drugs	302
Pteridophytes	306
<i>Glossary</i>	309

Volume 4

Q

Quorum Sensing	1
--------------------------	---

R

Radiation Hybrid Mapping	3
Radionuclides	4
Recombinant DNA	6
Regenerative Medicine	13
Remote Sensing	15
Replication of DNA	16
Reproduction in Plants	22

Biology, Second Edition

Reproductive Technology	31	Skin	110	Tuatara	190
Reptile	35	Sleep	112	Tundra	192
Respiration	36	Slime Molds	116	Tunicate	193
Restriction Fragment Length Polymorphism (RFLP)	40	Social Behavior	118	Turtle	194
Retrovirus	41	Sociobiology	122		
Reverse Transcriptase	43	Soil	125	U	
Rhythms of Plant Life	44	Southern and Northern Blotting	127	Urban Ecology	197
Ribosome	46	Speciation	129		
Riparian Zone	49	Species	132	V	
Rivers and Streams	51	Spinal Cord	135	Vaccines	199
RNA	54	Stress Response	137	Vacuole	203
RNA Processing	55	Structure Determination	139	van Helmont, Jan	203
Roots	58	Superbugs	141	Vavilov, Nikolay	204
S		Symbiosis	142	Vesalius, Andreas	205
Salinization	63	Synaptic Transmission	146	Viral Diseases	206
Scaling	64	Synthetic Biology	150	Virus	208
Secondary Metabolites in Plants	67			Vision	209
Seed Germination and Dormancy	70	T		Vitamins and Coenzymes	212
Seedless Vascular Plants	72	T Cells	153	von Humboldt, Alexander	214
Seeds	74	Taxonomy, History of	157		
Senescence	76	Temperature Regulation	160	W	
Sex Chromosomes	79	Theoretical Ecology	163	Warren, Robin	215
Sex Determination	81	Thyroid Gland	165	Water	216
Sexual Reproduction	84	Ti Plasmids	166	Water Movement in Plants	217
Sexual Reproduction, Evolution of	88	Tissue	167	Watson, James	220
Sexual Selection	90	Torrey, John	169	Wetlands	221
Sexually Transmitted Diseases	93	Touch	170	Wood and Wood Products	224
Shoots	98	Transcription	172		
Short Tandem Repeats	101	Transfer RNA	176	Y	
Signaling and Signal Transduction	101	Transgenic Techniques	178	Yamanaka, Shinya	229
Skeletons	108	Translocation	180		
		Transplant Medicine	184	Z	
		Transposon	188	Zoology	231
		Tropisms and Nastic Movements	189	Glossary	233
				Index	255