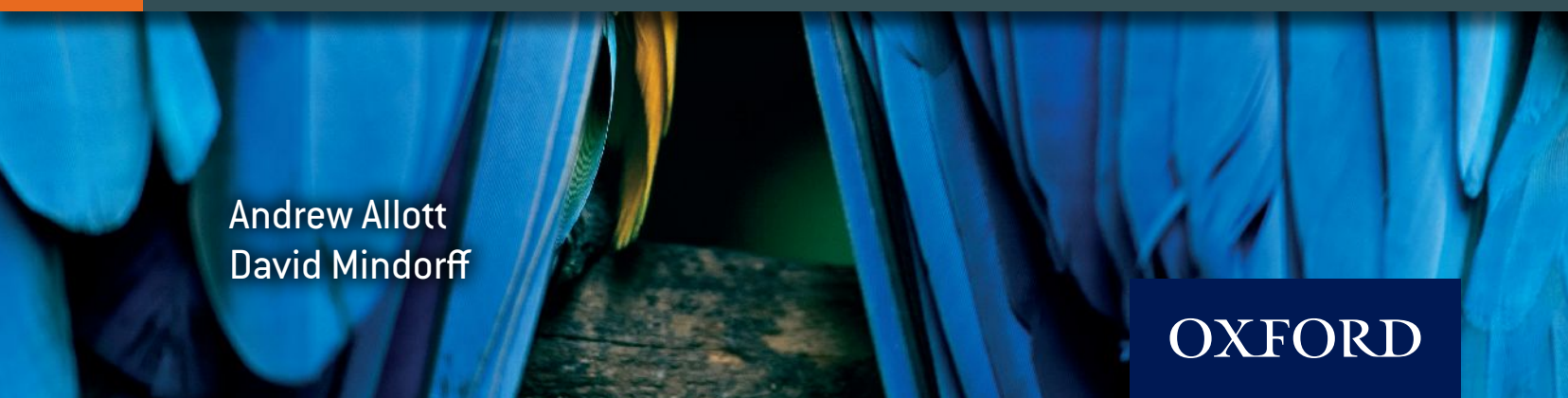
OXFORD IB DIPLOMA PROGRAMME

2014 EDITION

BIOLOGY

COURSE COMPANION



Andrew Allott
David Mindorff

OXFORD

Contents

1 Cell Biology
Introduction to cells 1
Ultrastructure of cells 16
Membrane structure 25
Membrane transport 33
The origin of cells 45
Cell division 51

2 Molecular Biology
Molecules to metabolism 61
Water 68
Carbohydrates and lipids 73
Proteins 87
Enzymes 96
Structure of DNA and RNA 105
DNA replication, transcription and translation 111
Cell respiration 122
Photosynthesis 129

3 Genetics
Genes 141
Chromosomes 149
Meiosis 159
Inheritance 168
Genetic modification and biotechnology 187

4 Ecology
Species, communities and ecosystems 201
Energy flow 213
Carbon cycling 220
Climate change 229

5 Evolution and biodiversity
Evidence for evolution 241
Natural selection 249
Classification and biodiversity 258
Cladistics 263

6 Human physiology
Digestion and absorption 279
The blood system 289
Defence against infectious diseases 302
Gas exchange 310
Neurones and synapses 319
Hormones, homeostasis and reproduction 329

7 Nucleic acids (AHL)
DNA structure and replication 343
Transcription and gene expression 355
Translation 362

8 Metabolism, cell respiration and photosynthesis (AHL)
Metabolism 373
Cell respiration 380
Photosynthesis 389

9 Plant biology (AHL)
Transport in the xylem of plants 403
Transport in the phloem of plants 412
Growth in plants 422
Reproduction in plants 429

10 Genetics and evolution (AHL)
Meiosis 439
Inheritance 445
Gene pool and speciation 455

11 Animal physiology (AHL)
Antibody production and vaccination 465
Movement 476
The kidney and osmoregulation 485
Sexual reproduction 499

A Neurobiology and behaviour
Neural development 513
The human brain 518
Perception of stimuli 526
Innate and learned behaviour 533
Neuropharmacology 541
Ethology 548

B Biotechnology and bioinformatics
Microbiology: organisms in industry 557
Biotechnology in agriculture 565
Environmental protection 575
Medicine 582
Bioformatics 591

C Ecology and conservation
Species and communities 603
Communities and ecosystems 613
Impacts of humans on ecosystems 625
Conservation of biodiversity 635
Population ecology 642
The nitrogen and phosphorous cycles 649

D Human physiology
Human nutrition 659
Digestion 671
Functions of the liver 678
The heart 684
Hormones and metabolism 694
Transport of respiratory gases 699

Internal Assessment
(with thanks to Mark Headlee for his assistance with this chapter) 708

Index 713