

2010: What's New in Level 8 Biology

Thank you for purchasing the first edition of the 2010 of *Level 8 Biology Student Workbook*. Biozone is committed to providing an up-to-date resource that caters for the requirements of students and teachers in New Zealand. The current edition of this workbook expands on the material developed in earlier editions. This summary provides a record of changes since the 2009 Year 13 edition.



General changes

There have been a large number of changes in this first edition of the *2010 Level 8 Biology Workbook*, relative to the *2009 Year 13 Biology Workbook*. Although the basic structure remains unchanged, this first edition sees the implementation of changes to meet the requirements of the new New Zealand Curriculum, particularly with respect to key competencies. The integration of NZ curriculum with the revised NCEA Achievement Standards will be completed when these come into effect in 2013. As part of the focus on key competencies, teachers will notice a shift towards a more contextual approach and an emphasis on scientific literacy and understanding. Homeostasis will continue to be developed as a unifying theme throughout the workbook; this will be in line with the proposed revisions to the NCEA Achievement Standards. This edition marks the first in a series of revisions. New features are:

- Each chapter begins with a concise topic introduction emphasising key concepts, key terms, and brief objectives. The current Achievement Standard(s) to which the chapter applies is clearly indicated. These will be revised according to the new NCEA Achievement Standards when these come into effect in 2013. As an adjunct to this, a teacher's stapled booklet will be provided free with each order of workbooks. This will include detail relevant to each of the numbered Learning Objectives in each topic introduction.
- Throughout the topic "*Biotechnology*", a lead-by-example approach has been applied to examining techniques and applications. There are a number of context-based examples and each is presented in the same systematic way. This approach gives students a clearer understanding of the techniques used in each particular case study, and the current and future applications of the technology.
- Each chapter includes literacy activities, in the form of mix and match, puzzles, games, and concept stories for comprehension and interpretation. The concept stories, together with the contextual approach, provide the opportunity for students to test their understanding within a real-world context.
- Periodical references are reduced to highly relevant articles only and are cited on the page to which they most apply. Keen students/teachers can obtain details of the citation in the Appendix (a new feature).
- We have provided an enhanced list of **web links** for activities (videos and animations) accessed through www.biozone.co.nz/weblink/NZL7-2504.html. Note that this resource is distinct from the Biolinks, which have long been a feature of the Biozone website. Each link provides a video clip or animation of particular relevance to the activity page on which it indicated.
- **Model Answers:** In response to popular request, the model answers have been revised with answers now provided in **A, M, E format**. As an adjunct to this, the model answers are provided as a show-hide feature on the non-printable PDF version of the workbook on the Teacher Resource CD-ROM. As was the case last year, extension material on the Teacher Resource CD-ROM has been updated and revised.
- **Removed content:** Teachers will notice that some material has been removed this year. This material can be either be found on the TRC as indicated at the beginning of the chapter, incorporated into other activities in a revised form, or available as a web link.

☆ New activities in this edition

Literacy activities:

Key Terms: Memory Card Game

An enjoyable way to help students remember words and definitions, with a competitive edge.

Key Terms: Word Find

A little different from traditional word finds, students must first solve the clue before they can find the word!

Key Terms: Crossword

Crosswords help student literacy in the selected topic. Students will need to know their key terms to solve it.

Key Terms: What am I?

A game requiring students to work in teams to help a team mate correctly determine their unknown word. Flexible format makes it suitable for any size class.

Key Terms: Mix and Match

Match each key term from the topic with its definition.

Page Activity and description

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| 10 | Investigating Habitat Preference
A reading and comprehension activity to introduce the material on investigating a niche. It provides students with an real-world example of investigative work in the field and is based on methods and catch results from field studies of native black mudfish. Questions focus on understanding how catch rates can be related to a quantitative assessment of habitat suitability. |
| 88 | Does DNA Really Carry the Code?
A reading and comprehension activity describing the methods used to confirm DNA as an information storage molecule and the unit of inheritance. Students are asked to explain why certain methods were used and what the outcome of those methods were. |
| 92 | Gene Detectives
A concept story that takes students through the development of the <i>lac</i> operon model and explains how Jacob and Monod's theory was built on the work of the scientists before them. |
| 101 | Oestrogen, Transcription and Cancer
A new activity exploring the link between oestrogen, the immune response, and the pathways leading to some cancers. It also shows how genes that have important roles in the body can also have extremely harmful effects. |
| 103 | A Gene That Can Tell Your Future
A concept story describing the cause of Huntington's Disease, its effects, and how the gene responsible for the disease was found. |
| 141 | Nature of Mutation
A revision of the material previously covered in three activities. The focus and intent of the activity is unchanged. |
| 202 | Communication is Everything
A high interest reading and comprehension activity exploring the role of unspoken communication in human social interactions. |
| 233 | Small Flies and Giant Buttercups
A concept story introducing students to some simple case studies in modern evolution: speciation in <i>Drosophila</i> and in NZ alpine buttercups. |



- 239 Natural Selection**
A summary of natural selection supported by a case study. The correlation between latitude and skin colour in humans provides convincing evidence of the role of opposing selection pressures in shaping the skin colour in the world's populations. This is a great topic for generating debate and really asking students to think about what "race" means in biological terms.
- 248 Isolation and Species Formation**
This activity explores the roles of geographical and ecological isolation in speciation by way of specific case studies.
- 284 Amazing Organisms, Amazing Enzymes**
A concept story explaining how one of biotechnology's most important techniques, PCR, was successfully developed after isolation of a thermophilic enzyme.
- 295 Forensic Applications of DNA Profiling**
An exploration of the forensic use of DNA profiling.
- 296 Preparing a Gene For Cloning**
This material, previously included in "Gene Cloning Using Plasmids", focusses on the preparation of a gene for cloning using reverse transcriptase.
- 301 Manual DNA Sequencing**
This activity (previously on the TRC) replaces "Automatic DNA Sequencing" (which is now a web link). It provides a more step-by-step explanation of the principles involved in DNA sequencing.
- 305 Golden Rice**
The techniques and involved in engineering a complete biosynthetic pathway in a crop plant. The rationale behind the approach is explored.
- 335 Food For the Masses**
This activity is designed to develop student understanding of what drives the use of genetic modification. Students must explain their choice of techniques to produce a GM plant. Visual prompts are provided but students must also make use of the technical information provided in previous activities.
- 337 Finding the Connection**
In this activity, students must explain their choice of techniques to identify the genetic relationships between breeds of sheep. Visual prompts are provided but students must also make use of the technical information provided in previous activities.
- 338 Repairing the Damage**
In this activity students assume the role of a specialist and explain treatment options to a patient with kidney failure. Visual prompts are provided but students must also make use of the technical information provided in previous activities.
- 357 *Ardipithecus ramidus***
This activity describes the latest information on one of our earliest ancestors and describes new evidence for the development of bipedalism.
- 362 Hominin Data Sheets: *Ardipithecus ramidus***
The hominin data sheets have been updated to include *Ardipithecus ramidus* in light of the importance given to the latest analysis of its skeleton.

△ Existing material upgraded in this edition

Activities revised in order to clarify ideas and improve the stimulus material, questions, format, or general content:

Page Activity and description

Objectives and Key Concepts in all topics

The introduction to each chapter is now a single page, visually appealing synopsis of the material to be covered in the chapter. The objectives are still provided as numbered points, but the emphasis is on key competencies and students should now be able to more easily identify knowledge requirements. Key concepts for the chapter introduce the learning objectives, and a list of key terms provides a focus for competency in literacy. A teacher's version of the

learning objectives, containing more explanatory detail, is provided in the Teacher's Handbook (free with orders) for each chapter.

- 59 Human Karyotype Exercise**
The unknown karyotype this year is Down syndrome.
- 82 Analysis of a DNA Sample**
Question 3 has been revised.
- 111 Chromosome Mapping**
This activity now covers the methods for calculating crossover values and drawing a gene map for multiple crossovers. The questions have remained the same.
- 135 Epistasis**
This activity now includes a wider range of examples.
- 244 Evolution of Drug Resistance**
This activity has been extensively revised and now includes an exploration of the extent of microbial drug resistance and its consequences.
- 249 Reproductive Isolation**
This activity has been revised with a greater number of specific examples.
- 267 Evolution of Darwin's Finches**
This activity provides more information-rich artwork but the intent and the questions are unchanged.
- 297 *In Vivo* Gene Cloning**
This activity includes an update on gene markers. Material on reverse transcription is in another activity and the questions have been revised accordingly.
- 303 Chymosin Production**
This activity had been revised using the new systematic approach described earlier. The questions have been revised accordingly.
- 307 Production of Insulin**
This activity had been revised using the new systematic approach described earlier. The questions have been revised accordingly.
- 309 Gene Therapy**
This activity has been substantially revised, providing a new representation of the principle of gene therapy and the vectors involved.
- 311 Gene Delivery Systems**
This activity describes two case studies in gene therapy: CF and SCID.
- 313 Monoclonal Antibodies**
This activity had been revised using the new systematic approach described earlier. The action of the anti-cancer monoclonal Herceptin has been included as a current, high profile case study.
- 323 Cloning by Nuclear Transfer**
using the new systematic approach described earlier.
- 325 Plant Tissue Culture**
using the new systematic approach described earlier.
- 355 The Emerging View**
The skull of *Ar. ramidus* has been added to the evolutionary tree, following its reconstruction in 2009.
- 359 Hominin Data Sheets**
The table has been revised to include *Ardipithecus ramidus*. *Paranthropus* now occupies only one sheet.
- 367 *Homo neanderthalensis***
The map on this page has been updated to included new Neanderthal fossil sites.
- 372 Bipedalism and Nakedness**
This page has been revised in light of the new analyses of *Ardipithecus* and it now emphasises the role of provisioning in the development of bipedalism. The introduction has been revised and a question is now included to involve the student in the information.

We hope that you enjoy using Level 8 Biology this year. As this edition represents the first stage of an extensive review process, we particularly invite comments and constructive criticism and will endeavour to implement suggestions wherever possible.... **the staff at Biozone.**

