BLITZING BIOLOGY 11

Syllabus Map

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PUBLICATIONS

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About Blitzing Biology 11

Blitzing Biology 11 is a student activity book, which contains activities that seek to address the content and skills outcomes for the *Biology Stage 6 Syllabus* (2017) – published by NESA (NSW Education Standards Authority).

To find out more about *Blitzing Biology 11* or to order a copy, please visit: www.blitzingbiology.com.au

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Disclaimers

This syllabus map is provided as a tool to assist teachers and students.

This syllabus map is designed as a guide to the main areas where each element of syllabus content for Modules 1–4 is addressed in Blitzing Biology 11. Science departments are advised to develop their own teaching program specific to their school and students, ensuring they address the NESA syllabus requirements in their entirety.

The syllabus content referred to in this document uses numerical references to the dot points contained in the NESA syllabus as digitally available at the time of publication. It is possible NESA will make changes to the syllabus following publication of this syllabus map. Please refer to the NESA website to view the most recent edition of the *Biology Stage 6 Syllabus* (2017).

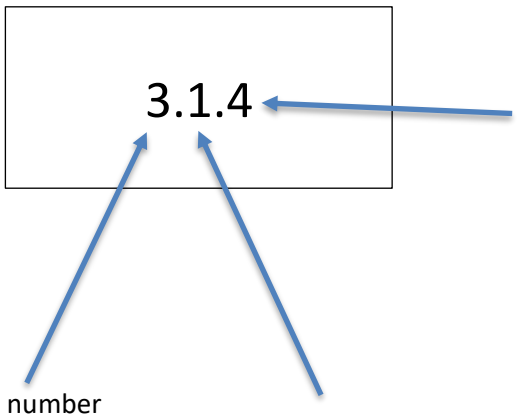
Please email the author if you would like to advise of any correction(s) needed for future editions: katrina@blitzingbiology.com.au

Guide to numerical syllabus references used in this syllabus map

This Blitzing Biology 11 syllabus map is designed to be used in conjunction with the NESA publication *Biology Stage 6 Syllabus* (2017). The syllabus content has not been reproduced in this document due to copyright restrictions.

Three numbers have been used to identify each of the content dot points of the syllabus. The first number identifies the module, the second number identifies the section (subheadings under each module), and the third number identifies the dot point within each section.

Key word(s) have been placed beside many of the reference numbers to assist in quickly identifying the relevant syllabus content.



The third number indicates the actual dot point within a section, in numerical order.
In this case, the fourth dot point in the first section of Module 3.

The first number indicates the module.
In this case, referring to Module 3.

The second number indicates the section of the module. Each section is indicated in the syllabus by a subheading, accompanied by an inquiry question.
In this case, referring to the first section of Module 3, which is Theory of Evolution by Natural Selection.

Module 1: Cells as the Basis of Life

1.1: Cell Structure

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 1.1	*Chapter 1 – Prokaryotic and eukaryotic cells* *Chapter 2 – Microscopy of cells*
1.1.1 – Prokaryotic vs eukaryotic	1.1 – What are cells? 1.2 – Prokaryotic versus eukaryotic cells 1.3 – Prokaryotic organisms 1.4 – *Vibrio fischeri* bacteria light up the lab 1.5 – Eukaryotic cells 1.6 – The evolution of eukaryotic cells 1.7 – Is all life made of cells? 2.4 – Practical activity: observing and comparing cells 2.5 – Cell specialisation
– Technologies	2.6 – Microscope technologies
1.1.2 – Diagrams	2.1 – Seeing cells 2.2 – Experiment: Using dyes to observe onion cells 2.3 – Microscope maths 2.4 – Practical activity: observing and comparing cells
– Organelle arrangements	2.4 – Practical activity: observing and comparing cells 2.5 – Cell specialisation
– Cell membrane	3.1 – Moving in and out of cells 3.2 – A closer look at cell membranes 3.3 – The fluid mosaic model of cell membranes 3.4 – Modelling the cell membrane

Module 1: Cells as the Basis of Life [continued]

1.2: Cell Function

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 1.2	*Chapter 3 – Membranes and cell transport* *Chapter 4 – Photosynthesis and respiration*
1.2.1 – Osmosis and diffusion	3.5 – Diffusion passively moves substances 3.6 – Experiment: Osmosis in 'naked' eggs 3.7 – Further observations of osmosis and diffusion 3.14 – Cellular transport review
– Methods of transport	3.9 – Getting active: protein pumps 3.10 – Crafty membranes: vesicular transport 3.14 – Cellular transport review
– SA:V ratio etc	3.8 – The effect of tonicity on your cells 3.11 – Experiment: Changing rates of reaction 3.12 – Experiment: Diffusion in different cube sizes 3.13 – Surface area to volume (SA:V) ratio
1.2.2 Cell requirements	4.8 – Life needs carbon and energy 3.1 – Moving in and out of cells
1.2.3 Photosynthesis and respiration	*Chapter 4 – Photosynthesis and respiration* 8.1 – Photosynthesis and respiration revision
1.2.4 Enzymes	*Chapter 6 – Enzyme depth study* (see following page for more information)
1.2.5 Enzymes	

Module 1: Cells as the Basis of Life [continued]

Depth study: Enzymes

<table>
<tr><th>Depth study requirements</th><th>Blitzing Biology section</th></tr>
<tr><td>Compulsory skill outcomes:
• Questioning and predicting
• Communicating</td><td rowspan="3">Chapter 6 – Enzymes depth study is designed to fulfil the requirements of a depth study, focused on enzymes.

This chapter begins with theoretical aspects of enzymes, providing a thorough introduction to the role and function of enzymes.

Chapter 6 includes two scaffolded practical investigations examining the effect of temperature and pH on enzyme activity. These are designed to assist students in developing their confidence in conducting enzyme investigations prior to planning and conducting their own practical investigation.

Activity 6.6 – Enzyme experiment design requires students to plan and conduct their own practical investigation. They are provided with a choice of enzymes and areas of investigation. Students are given scaffolding to assist in planning their investigation. It is advised that students complete Chapter 5 – Biology Skill drills prior to this task to build their confidence in planning investigations.

The Questioning and Predicting outcome can be addressed in preparing experiment hypotheses, while the Communicating outcome can be addressed in preparing an experiment report.</td></tr>
<tr><td>Additional skill outcomes:
• Planning investigations
• Conducting investigations</td></tr>
<tr><td>Related knowledge and understanding outcome:
1.2.5 Enzymes</td></tr>
<tr><td>Assessment

One assessment task in your program must focus on a depth study or aspect of a depth study.

This task can have a minimum weighting of 20% and a maximum weighting of 40%.</td><td>A depth study must include an assessable component. It is recommended that the experiment report produced from completing 6.6 Enzyme experiment design be assessed.</td></tr>
</table>

Note: If using another component of the Biology course as a depth study, it is advised that teachers select which parts of Chapter 6 they would like their students to complete.
Note: 15 hours of the program should be allocated to the depth study or depth studies.

Module 2: Organisation of Living Things

2.1: Organisation of Cells

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 2.1	7.3 – How to build a multicellular organism
2.1.1 Unicellular, colonial and multicellular	7.1 – Slime mould solve mazes 7.2 – Is a blue bottle one organism? 2.5 – Cell specialisation
2.1.2 Cells, tissues, organs, systems	7.3 – How to build a multicellular organism 2.5 – Cell specialisation 8.2 – A systematic approach to multicellular organisms *Note*: tissues, organs and systems are further introduced as relevant in: *Chapter 8 – Animal nutrition, gas exchange and transport* *Chapter 9 – Plant nutrition, gas exchange and transport*
2.1.3 Structure of multicellular organisms	7.3 – How to build a multicellular organism

Module 2: Organisation of Living Things [continued]

2.2: Nutrient and Gas Requirements

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 2.2	4.8 – Life needs carbon and energy 9.3 – Nutrition in plants 8.3 – Why can't I just eat sugar? 9.11 – Animals versus plants
2.2.1 Autotroph structure	9.1 – Gas exchange in plant leaves 9.2 – Leaf impressions to examine their stomata 9.5 – Plant structure and adaptations 9.8 – Observing water transport in the xylem
2.2.2 Function of plant structures	9.1 – Gas exchange in plant leaves 9.2 – Leaf impressions to examine their stomata 9.4 – The role of roots 10.6 – Radioactive carbon tracing
2.2.3 Gas exchange in plants / animals	8.7 – Gas exchange in humans 8.8 – Gas exchange in animals 9.1 – Gas exchange in plant leaves 9.2 – Leaf impressions to examine their stomata
2.2.4 Development of theories / models	*Chapter 10 – Photosynthesis* 9.7 – The movement of water in the xylem 9.8 – Observing water transport in the xylem
2.2.5 Mammalian digestion	8.3 – Why can't I just eat sugar? 8.4 – The human digestive system 8.5 – A scientific scoop on your poop 8.6 – Digestion in other mammals
2.2.6 Autotrophs vs heterotrophs	4.8 – Life needs carbon and energy 9.11 – Animals versus plants

Module 2: Organisation of Living Things [continued]

2.3: Transport

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 2.3	8.14 – Changing blood composition 9.10 – Seeing transport structures in plants
2.3.1 Transport systems	8.11 – Blood vessels 8.12 – Composition of blood 8.13 – Hearts are muscular machines 9.6 – Transport in plants 9.7 – The movement of water in the xylem 9.8 – Observing water transport in the xylem 9.9 – The movement of sugars in the phloem 9.10 – Seeing transport structures in plants
2.3.2 Gas exchange	8.8 – Gas exchange in animals 9.1 – Gas exchange in plant leaves 9.2 – Leaf impressions to examine their stomata
2.3.3 Transport systems	8.9 – Transport in animals 8.10 – Closed circulatory systems 8.11 – Blood vessels 8.12 – Composition of blood 8.13 – Hearts are muscular machines 9.6 – Transport in plants 9.7 – The movement of water in the xylem 9.8 – Observing water transport in the xylem 9.9 – The movement of sugars in the phloem 9.10 – Seeing transport structures in plants
2.3.4 Transport medium	8.14 – Changing blood composition 9.10 – Seeing transport structures in plants

Module 3: Biological Diversity

3.1: Effects of the Environment on Organisms

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 3.1	11.1 – Variety is the spice of life 11.4 – Selection pressures can change abundance
3.1.1 Selection pressures	11.2 – Selection pressures 11.3 – Examples of selection pressures
3.1.2 Case studies	11.3 – Examples of selection pressures 11.5 – Selection pressures research presentations

3.2: Adaptations

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 3.2	12.1 – Ecological niches 12.2 – Types of adaptations
3.2.1 Types of adaptations	12.2 – Types of adaptations 12.3 – Adaptations case study
3.2.2 Darwin	13.1 – Natural selection 13.5 – Sexual selection 15.5 – Why are they called 'Darwin's finches'?

3.3: Theory of Evolution by Natural Selection

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 3.3	11.1 – Variety is the spice of life 17.4 – The diversity of life … extended response
3.3.1 Diversity of life	17.1 – Life on early Earth 17.2 – Major events in the history of life on Earth 17.3 – The tree of life 17.4 – The diversity of life … extended response
3.3.2 Speciation	14.2 – Microevolution can lead to speciation 14.3 – Case study: Anole lizards 15.4 – Evolutionary relationships in Darwin's finches 15.6 – An extended response on speciation 16.6 – The fossil record of the horse and its ancestors
3.3.3 Divergent vs convergent evolution	14.1 – Divergent and convergent evolution 14.3 – Case study: Anole lizards 15.4 – Evolutionary relationships in Darwin's finches
3.3.4 Punctuated equilibrium vs gradualism	15.7 – Does speciation occur quickly or slowly?

Module 3: Biological Diversity [continued]

3.4: Evolution – the Evidence

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 3.4	*Chapter 16 – Evidence for evolution*
3.4.1 Evidence for evolution	16.1 – Evidence for evolution 16.2 – Vestigial structures 16.3 – Comparative anatomy and embryology 16.4 – DNA-DNA hybridisation 16.5 – Dating rocks and fossils
3.4.2 Examples of evolution	13.2 – Dark colourings jumped into the peppered moth 13.3 – Natural selection of rock pocket mice 13.4 – Antibiotic resistance in bacteria 13.6 – Cane toads version 2.0 – bigger, stronger, faster 13.7 – Natural selection video production

Module 4: Ecosystem Dynamics

4.1: Population Dynamics

Biology Stage 6 Syllabus (2017) reference	*Blitzing Biology section*
INQUIRY QUESTION 4.1	*Chapter 18 – Population ecology*
4.1.1 Ecosystems – Abiotic factors	11.2 – Selection pressures 11.3 – Examples of selection pressures 19.6 – Surveying your local ecosystem
– Biotic relationships	18.2 – Biotic relationships 18.4 – Using food webs to make predictions
– Niches	12.1 – Ecological niches 18.5 – The ecological niche of the eastern quoll
– Making predictions	18.1 – Wallaby population control 18.3 – Biotic relationship graphs 18.4 – Using food webs to make predictions
– Sampling	*Chapter 19 – Sampling methods*
4.1.2 Example of extinction	18.6 – The extinction of the Tasmanian tiger

Module 4: Ecosystem Dynamics [continued]

4.2: Past Ecosystems

Biology Stage 6 Syllabus (2017) content	*Blitzing Biology section*
INQUIRY QUESTION 4.2	11.2 – Selection pressures 11.3 – Examples of selection pressures
4.2.1 Evidence for changes to ecosystems	16.5 – Dating fossils and rocks 20.1 – Australia – drifting on a bed of magma 20.2 – Back to the future: ice core drilling 20.3 – Evidence of Australia's changing ecosystems 20.4 – Aussie vegetation: changes through time 20.6 – Artistic evidence
4.2.2 Technologies used	16.5 – Dating fossils and rocks 20.2 – Back to the future: ice core drilling 20.3 – Evidence of Australia's changing ecosystems
4.2.3 Evolution of plants / animals in Australia	20.5 – Megafauna … they were literally *big* animals 20.4 – Aussie vegetation: changes through time
4.2.4 Causes of changes	20.3 – Evidence of Australia's changing ecosystems 20.4 – Aussie vegetation: changes through time 20.5 – Megafauna … they were literally *big* animals 21.1 – Mass extinctions

4.3: Future Ecosystems

Biology Stage 6 Syllabus (2017) content	*Blitzing Biology section*
INQUIRY QUESTION 4.3	21.1 – Mass extinctions 21.2 – Case studies: human-induced threats to species
4.3.1 – Human impacts	21.1 – Mass extinctions 21.2 – Case studies: human-induced threats to species
– Models	21.4 – CSIRO eReefs research models 21.5 – Monitoring ecosystems using indicator species
– Climate change	21.3 – Climate change threatens the Great Barrier Reef
4.3.2 Restoration	21.6 – Restoring Sydney Harbour

