

# South Australia

Material (including preparatory material) for the SA Stage 2 Biology Course is covered in both this and the Year 12 Workbook. Candidates must complete all themes and the practical component. Please consult the SSABSA syllabus statement for details on

strand structure within each theme. Course material is covered in the workbook as indicated. Additional material is available on the Teacher Resource CD-ROM. Weblinks supporting each topic are present throughout, but are not specifically indicated.

Stage 2 Biology		Topic in Workbook (Year 11 unless indicated otherwise)	Topic in Workbook (Year 11 unless indicated otherwise)
<b>Theme M: Macromolecules</b>			<b>Theme O: Organisms</b>
M1-4	Structure and role of DNA. The structure and function of chromosomes. The gene as the functional unit of information. DNA transcription, translation, protein synthesis.	Cell Structure Cellular Processes Year 12 workbook	O1 Differentiation of cells for a specialised function. Hierarchical structure of organisation within multicellular organisms. Cellular Processes
M5	Protein structure and function.	Cell Structure	O2 The role of the nervous and hormonal systems in coordination and control. The gene as the functional unit of information. Year 12 workbook
M6	The structure and roles of lipids and polysaccharides.	Cell Structure	O3 Response to stimuli: sensory receptors and reflex responses. Year 12 workbook
M7	The mechanism of DNA replication.	Year 12 workbook	O4 Properties of exchange surfaces: structure and function of the kidney nephron, lung alveoli, villi. The role of blood and lymph capillaries in the exchange of materials. Gas Exchange Plant & Animal Nutrition Transport & Excretion
M8	Enzyme function: the induced-fit model and factors affecting enzyme activity.	Cell Structure Year 12 workbook	O5 Maintenance involved in control of body temperature. Environment & Adaptation Year 12 workbook
M9	Plasma membrane receptors and molecular recognition.	Cellular Processes Year 12 workbook	O6-7 Energy requirements: photosynthesis, cellular respiration (aerobic & anaerobic). Autotrophic & heterotrophic nutrition. Plant & Animal Nutrition Gas Exchange Year 12 workbook
M10	Enzyme reaction rates and the role of enzymes as catalysts.	Cell Structure Year 12 workbook	O8-9 Comparison of asexual and sexual reproduction in eukaryotes. Significance of meiosis: crossing over, and independent assortment. Reproduction & Development Year 12 workbook
M11	Macromolecules as energy reserves.	Cell Structure Year 12 workbook	O10 Meiosis and its contribution to genetic variation in offspring. Year 12 workbook
M12	How DNA carries genetic information. Perpetuation of DNA through replication.	Year 12 workbook	O11 Natural selection: some characteristics increase survival and reproduction. Year 12 workbook
M13	Universal presence of DNA as evidence for the common ancestry of living things.	Year 12 workbook	O12 Techniques and ethics of genetic manipulation of organisms. Year 12 workbook
M14	Uses of DNA and protein sequences for determining relatedness.	Year 12 workbook	O13 The role of diet, exercise, and drugs on human health. (Aspects covered). Transport & Excretion Year 12 workbook
M15	Changes within genes: mutagens, mutations and their consequences.	Year 12 workbook	
M16-17	Techniques and applications of DNA manipulation and DNA technology.	Year 12 workbook	
<b>Theme C: Cells</b>			<b>Theme E: Ecosystems</b>
C1	The cell as the unit of life. The significance of cell surface area to volume ratio.	Cell Structure Cellular Processes	E1 Population and community structure, the species concept, reproductive isolating mechanisms. Population Dynamics Communities Year 12 workbook
C2	Structure and size of prokaryotic and eukaryotic cells. Eukaryotic cell organelles. Size, structure, and role of genomes.	Cell Structure Year 12 workbook	E2 The role of producers, consumers, and decomposers in a community. Communities
C3	Structure and function of the plasma membrane and the cytoskeleton. Endocytosis and exocytosis	Cell Structure Cellular Processes	E3 Communities influenced by environmental factors. Environment & Adaptation
C4	Regulation of the intracellular environment. Selective exchanges at the cell membrane.	Cellular Processes	E4 Productivity and nutrient cycling. Communities
C5	Passive and active transport mechanisms.	Cellular Processes	E5 Energy flow in communities, input and output of energy. Communities
C6-7	Energy requirements of cells. Role of ATP. Photosynthesis and its regulation. Enzyme control of metabolic pathways.	Plant & Animal Nutrition Year 12 workbook	E6 Ecological succession and biodiversity. Changes in Ecosystems Evolution of Australia's Biota
C8	Cell division. Comparing binary fission in prokaryotes and mitosis in eukaryotes.	Cellular Processes Reproduction & Development	E7 Reproductive strategies of <i>r</i> and <i>K</i> selected species. Population Dynamics
C9	The role of genes and hormones in regulating cell division. Carcinogens: their disruption of cell division.	Year 12 workbook	E8 Natural selection, the gene pool, and genetic variability in a population. Year 12 workbook
C10	Evolution of cells: early existence of prokaryotic cells.	The Origin & Evolution of Life	E9 Geographical isolation and speciation. Year 12 workbook
C11	The techniques involved in cell culture and applications of cultured cells.	Year 12 workbook	E10 Human impact on communities, species extinction, habitat conservation. Human Impact on Ecosystems
C12	The effects of chemicals on the metabolism of cells.	Not yet covered	E11 Human population growth and resources. <i>also see</i> Ecosystems Supplement on the TRC
			<b>Skills</b>
			Skills include hypothesis formation, experimental design. Observation, replication, repetition, precision, accuracy of experiments. Data analysis and interpretation. Communication and presentation of results. Skills in Biology Practical Ecology <i>also see</i> Spreadsheets & Statistics on the TRC