South Australia

A course guide for candidates taking the SA Stage 2 Biology Course is provided below. Material (including preparatory material) for this course is covered in this and the Year 11 Workbook. Candidates must complete all themes and the practical component. Consult the SSABSA syllabus for details on strand structure within each theme. Course material is covered in the workbook as below. Additional material to complete a unit requirement is available on the Teacher Resource CD-ROM and identified below. Weblinks for each topic are identified throughout each chapter, but are not specifically indicated..

Stage 2 Biology

Theme M: Macromolecules

		Topic in Workbook (Year 12 unless indicated otherwise)
M1	DNA: The molecular structure of DNA and its role as the chemical unit of information.	The Chemistry of Life The Genetic Code
M2-3	Structure and role of chromosomes. The gene as the functional unit of information.	The Genetic Code
M4	DNA transcription, translation, and protein synthesis, includes mRNA and tRNA.	The Genetic Code
M5-6	Protein structure and function. The structure and roles of polysaccharides and lipids.	The Chemistry of Life
M7	The mechanism of DNA replication.	The Genetic Code
M8	Enzyme function: the induced-fit model and factors affecting enzyme activity.	The Chemistry of Life
M9	Plasma membrane receptors and molecular recognition.	The Chemistry of Life Principles of Homeostasis
M10	Enzyme reaction rates and the role of enzymes as catalysts.	The Chemistry of Life
M11	Macromolecules as energy reserves.	The Chemistry of Life
M12	How DNA carries genetic information. Perpetuation of DNA through replication.	The Genetic Code
M13	Universal presence of DNA as evidence for the common ancestry of living things.	The Evidence for Evolution
M14	Uses of DNA and protein sequences for determining relatedness.	The Evidence for Evolution
M15	Changes within genes: mutagens, mutations and their consequences.	Mutations
M16	Techniques of DNA manipulation (gene transfer, ethics of DNA manipulation).	Gene Technology
M17	Techniques and applications of DNA technology (PCR, DNA sequencing, DNA fingerprinting).	Gene Technology

Theme C: Cells

		Topic in Workbook (Year 12 unless indicated otherwise)
C1	The cell as the unit of life. The significance of cell surface area to volume ratio.	Year 11 workbook
C2	Structure and size of prokaryotic and eukaryotic cells. Eukaryotic cell organelles. Size, structure, and role of genomes.	Year 11 workbook The Genetic Code
C3	Structure and function of the plasma membrane and the cytoskeleton. Endocytosis and exocytosis.	Chemistry of Life Year 11 workbook
C4	Regulation of the intracellular environment. Selective exchanges at the cell membrane.	Principles of Homeostasis Year 11 workbook
C5-6	Passive and active transport mechanisms. Energy requirements of cells. Role of ATP.	The Chemistry of Life Year 11 workbook
C7	Photosynthesis and its regulation. Enzyme control of metabolic pathways.	Cellular Energetics
C8	Cell division. Comparison of binary fission in prokaryotes and mitosis in eukaryotes	The Genetic Code Year 11 workbook
C9	Hormones and genes in regulating cell division. Carcinogens: their disruption of cell division.	Mutations
C10	Evolution of cells: early existence of prokaryotic cells.	Year 11 workbook
C11	The techniques involved in cell culture and applications of cultured cells.	Cell Division & Cloning
C12	The effects of chemicals on the metabolism of cells.	Not yet covered

Theme O: Organisms

		Topic in Workbook (Year 12 unless indicated otherwise)
O1	Differentiation of cells for a specialised function. The hierarchical structure of organisation in multicellular organisms.	Year 11 workbook
O2	The role of the nervous and hormonal systems in coordination and control. The gene as the functional unit of information.	Principles of Homeostasis Control & Coordination The Genetic Code
O3	Response to stimuli: sensory receptors and reflex responses.	Control & Coordination
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.	Homeostasis & Adaptation Year 11 workbook
O5	Maintenance involved in the control of body temperature.	Homeostasis & Adaptation
O6-7	Energy requirements: photosynthesis, cellular respiration (aerobic/anaerobic). Autotrophic and heterotrophic nutrition.	Celular Energetics Year 11 workbook
O8-9	Asexual vs sexual reproduction. Meiosis: crossing over, and independent assortment.	Year 11 workbook Inheritance
O10	Meiosis and its contribution to genetic variation in offspring.	Inheritance
O11	Natural selection: some characteristics increase the chances of survival and reproduction.	Population Genetics
O12	Techniques and ethics of the genetic manipulation of organisms.	Gene Technology
O13	The role of diet, exercise, and drugs on human health. (Aspects covered).	Non-infectious Disease Homeostasis & Adaptation

Theme E: Ecosystems

		Topic in Workbook (Year 12 unless indicated otherwise)
E1	Population and community structure. The species concept, reproductive isolating mechanisms.	Year 11 workbook Evolution
E2	The role of producers, consumers, and decomposers in a community.	Year 11 workbook
E3-5	The influence of environmental factors on communities. Productivity and nutrient cycling. Energy flow in communities.	Year 11 workbook
E6-7	Ecological succession and biodiversity. Reproductive strategies of *r* and K selected species.	Year 11 workbook
E8	Natural selection, the gene pool, and genetic variability in populations.	Population Genetics
E9	Geographical isolation and speciation.	Evolution
E10-11	Human impact on communities, habitat conservation. Human population growth and resources.	Year 11 workbook *also see* Ecosystem Supplement on the TRC

Skills

	Skills covered: hypotheses and experimental design. Observation, replication, repetition, precision and accuracy of experiments. Analysis and interpretation of data. Communication and presentation of results.	Year 11 workbook: Skills in Biology Practical Ecology *also see* Spreadsheets & Statistics on the TRC