YEAR 12 STARTER KIT | 2027

Biology

From DNA to ecosystems — understanding life

SACE Stage 2 | South Australia

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Welcome to Stage 2 Biology

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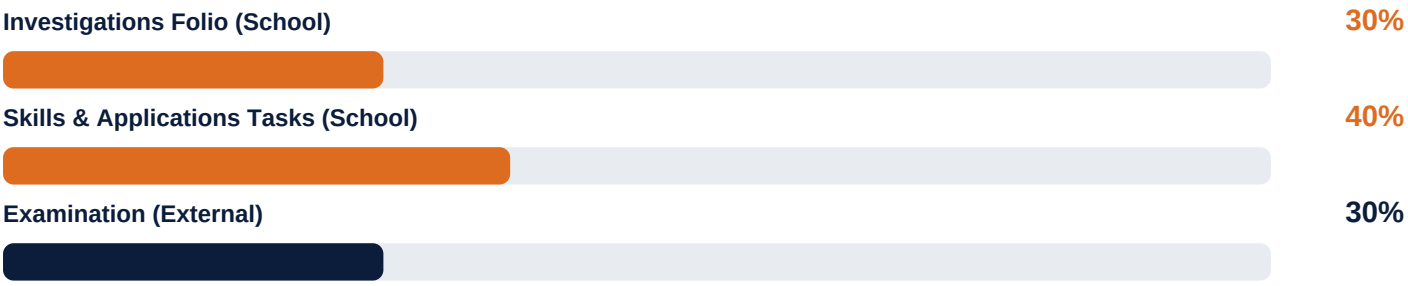
What You Should Know from Stage 1

Before diving into Stage 2 Biology, make sure you're confident with these Stage 1 foundations. If any feel shaky, revise them in the holidays — it'll make your Year 12 start so much smoother.

- [x] Cell structure (prokaryotic and eukaryotic)
- [x] Basic genetics (Mendel, Punnett squares)
- [x] Classification of living things
- [x] Ecosystems and food webs
- [x] Scientific investigation skills

How You'll Be Assessed

Stage 2 Biology is assessed through school assessment (70%) and external assessment (30%). Here's the breakdown:



Topics You'll Cover

Stage 2 Biology is organised into 4 main topics. Each topic builds on the last, so staying on top of the content week by week is crucial.

1 DNA and Proteins

- DNA structure and semi-conservative replication
- Gene expression: transcription and translation
- Mutations and their effects
- Gene regulation and epigenetics
- Biotechnology (PCR, gel electrophoresis, CRISPR)

2 Cells as the Basis of Life

- Cell theory and cell types
- Membrane structure and transport
- Cellular respiration (aerobic and anaerobic)
- Photosynthesis (light and dark reactions)
- Cell division (mitosis and meiosis)

3 Homeostasis

- Feedback mechanisms (negative and positive)
- Thermoregulation (ectotherms vs endotherms)
- Osmoregulation and excretion
- Neural and hormonal control
- Immune response

4 Evolution

- Evidence for evolution (fossil, molecular, comparative)
- Natural selection and adaptation
- Speciation and biodiversity
- Human evolution
- Classification and phylogenetics

Key Formulas and Concepts

These are some of the most important formulas and concepts you'll use throughout the year. Bookmark this page — you'll come back to it often.

DNA: A-T, C-G base pairing

Complementary base pairing rules

mRNA codon table (64 codons -> 20 amino acids)

Genetic code for translation

C6H12O6 + 6O2 -> 6CO2 + 6H2O + ATP

Summary equation for aerobic respiration

6CO2 + 6H2O -> C6H12O6 + 6O2

Summary equation for photosynthesis

Hardy-Weinberg: p^2 + 2pq + q^2 = 1

Allele frequency in populations

Insider Tips from Our Tutors

Draw Everything

Biology is visual. Draw and label DNA replication forks, cell membranes, feedback loops, and phylogenetic trees. Diagrams in your exam answers score marks that words alone miss.

Science as a Human Endeavour

One of your investigation folio tasks must focus on how science connects to society (ethics, technology, environmental impact). Choose a topic you're genuinely interested in — CRISPR and gene editing is a popular and rich choice.

Link the Topics

The four topics connect: DNA (Topic 1) codes for proteins that drive cellular processes (Topic 2), which maintain homeostasis (Topic 3), and variation in DNA drives evolution (Topic 4). Exam questions often cross topic boundaries.

Common Mistakes to Avoid

Our tutors have seen these mistakes cost students marks year after year. Learn from others' errors so you don't repeat them.

X Describing instead of explaining

The exam asks you to EXPLAIN mechanisms. "DNA is copied" scores nothing. "Helicase unwinds the double helix, DNA polymerase adds complementary nucleotides in the 5' to 3' direction" scores full marks.

X Ignoring the command word

Compare, contrast, evaluate, discuss, and explain all require different things. "Compare" needs both similarities and differences. "Evaluate" needs a judgement.

X Weak experimental design

Your investigation folio requires proper controlled variables, repeated trials, and processed data with uncertainty. Students who skip these lose marks on the easiest parts.

Your Year 12 Study Timeline

A term-by-term plan to stay on top of Stage 2 Biology. Adapt this to your school's order of topics, but keep the revision schedule tight.

Term 1 (Weeks 1-10)

- Master DNA replication, transcription, and translation (Topic 1)
- Learn biotechnology techniques (PCR, gel electrophoresis)
- Start first Investigation Folio task

Term 2 (Weeks 1-10)

- Complete cell biology (Topic 2) — respiration and photosynthesis
- Start homeostasis (Topic 3)
- Submit Investigation Folio draft

Term 3 (Weeks 1-10)

- Complete homeostasis and evolution (Topics 3 & 4)
- Finalise all school assessment tasks
- Begin exam revision — diagram practice is key

Term 4 / Exam Prep

- Complete 5+ past exams under timed conditions
- Draw and label every key diagram from memory
- Practice linking across all 4 topics — exam questions cross boundaries

Exam Day Strategies

When exam day arrives, these strategies will help you maximise your marks. Print this page and stick it on your wall in the weeks leading up.

Strategy 1

Use correct scientific terminology. "Cell eating" = 0 marks. "Phagocytosis" = full marks. The exam rewards precision.

Strategy 2

Draw labelled diagrams wherever possible — DNA replication forks, feedback loops, cell membranes. They often earn marks that words alone miss.

Strategy 3

For extended response questions, structure your answer: state the concept, explain the mechanism, give a specific example.

Strategy 4

Time is tight in Biology exams. If a question asks for TWO examples, give exactly two — extra examples waste time.

Ready to Ace Biology?

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