

# HSC

Students must complete the Preliminary course before undertaking the HSC course. Candidates taking the HSC course must complete all three core topics and ONE of the options, as well as an assessment of practical work. Course material is

covered in the workbook in the topics indicated. The CD-ROM symbol indicates that additional material is available on the Teacher Resource CD-ROM. Weblinks supporting each topic are present throughout, but are not specifically indicated.

HSC Year 12 course		Topic in Year 12 Workbook	Topic in Year 12 Workbook
<b>Core 9.2: Maintaining a Balance</b>			
1	Role of enzymes in metabolism. Physical factors influencing enzyme reaction rates. Homeostasis and temperature regulation in animals. Plant responses to temperature.	The Chemistry of Life Principles of Homeostasis Homeostasis & Adaptation Control & Coordination	
2	Composition and role of blood. Adaptations to altitude. Artificial blood. Gas transport and regulation of blood gases. Structure and function of arteries and veins. Transport in plants.	Homeostasis & Adaptation ● Transport & Water Balance in Plants	
3	Wastes in terrestrial and aquatic animals. Excretion in fish and mammals. Role and function of the mammalian kidney (including the role of hormones in regulation of function). Excretion in plants. Adaptations of plants that assist in minimising water loss.	Homeostasis & Adaptation ● Excretion & Osmoregulation ● Transport & Water Balance in Plants	
<b>Core 9.3: Blueprint of Life</b>			
1	Environmental change and evolution. Evidence in support of evolutionary theory. The consequences of evolution by natural selection and isolation: adaptive radiation, divergent evolution, and convergent evolution.	Evolution Evidence for Evolution Population Genetics Evolution	
2	Mendel's experiments. Simple monohybrid crosses. Dominant and recessive alleles, phenotype. Inherited patterns and pedigrees.	Inheritance ● Inheritance Supplement	
3	Nature of chromosomes and genes. Meiosis and genetic variation. Inheritance involving sex linkage and codominance. Environmental effects on gene expression.	The Genetic Code Inheritance	
4	DNA structure and replication. Protein synthesis. Origins, causes and effects of mutations. Variation as the raw material for natural selection. Punctuated equilibrium and gradualism.	The Genetic Code Mutations Population Genetics Evolution	
5	Reproductive technologies and genetic engineering and their consequences to the genetic composition of populations. Transformation: techniques and applications. Ethics of using transgenic organisms.	Gene Technology	
<b>Core 9.4: The Search for Better Health</b>			
1	Health vs Disease. The genetic and cellular basis of health and disease.	Non-infectious Disease Mutations	
2	Infectious v non-infectious disease. The role of hygiene in controlling disease. Conditions under which organisms become pathogens.	Pathogens & Disease ● Parasitic Infections	
3	The work of Pasteur and Koch in identifying the cause of disease. Pathogens and examples of diseases they cause. Role of antibiotics in managing disease.	Pathogens & Disease ● Parasitic Infections	
4	First and second lines of defence. Antigens as molecular triggers for an immune response. Microflora in humans. Self recognition and the reasons behind transplant rejection.	Defence & the Immune System	
5	Third line of defence. Structure and role of the immune system: cell and antibody mediated immunity. Role of vaccinations. Organ transplants.	Defence & the Immune System ● Organ Transplants	
6	Features of epidemiology. Examples of non-infectious diseases and their classes.	Pathogens & Disease Non-infectious Disease	
7	Role of quarantine in preventing spread of disease in Australia. Strategies for the control and/or prevention of disease.	Pathogens & Disease Gene Technology	
<b>Option 9.5: Communication</b>			
1-4	Receptors and sensory reception. Structure and function of the human eye, including accommodation. Correcting visual problems. Photoreceptor cells: colour vision and its role in animal communication		Control & Coordination
5-7	Sound production and reception. Structure and function of the human ear. The basis of nerve transmission. The interpretation of sensory information.		Control & Coordination
<b>Option 9.6: Biotechnology</b>			
1-3	Origins of biotechnology. Industrial applications of microbial fermentation. Strain isolation		● Biotechnology
4-7	Enzymes, protein synthesis, and recombinant DNA technology. Applications of these to biotechnology (transplants, monoclonal antibodies). Wider applications, ethical issues, and areas of research in biotechnology.		The Chemistry of Life The Genetic Code Gene Technology Defence & the Immune System
<b>Option 9.7: Genetics: The Code Broken?</b>			
1	Gene structure and the genetic code. Gene expression through polypeptide production.		The Genetic Code
2	Multiple alleles: ABO/Rh blood groups, polygenetic inheritance. DNA fingerprinting (profiling) and its uses.		Defence & the Immune System, Inheritance Gene Technology
3	Meiosis. Inheritance: dihybrid crosses. Chromosome mapping.		Inheritance
4	Human Genome Project. Recombinant DNA and its use in gene mapping.		Gene Technology
5	Gene therapy and its current uses in the management of disease.		Gene Technology
6	Mutations, mutagens, and DNA self-repair.		Mutations
7	Selective breeding (artificial selection) Gene cloning and whole organism cloning: applications and effects on species genetics.		Population Genetics Cell Division & Cloning
8	The role of genes in embryonic and later development. Gene homologues.		The Evidence for Evolution Year 11 workbook
<b>Option 9.8: The Human Story</b>			
1	Hierarchical classification. Species definition. Distinguishing features of humans. Primate characteristics.		Evolution Human Evolution
2-4	Evidence for human evolution. Fossil dating and interpretation. Alternative views on human evolution. Features of hominids. Evidence for human migration. Polymorphism examples.		Evidence for Evolution Human Evolution ● Human Evolution Supplement Population Genetics
5-6	Cultural evolution of humans and possible impacts. Current and future trends in biological and cultural development.		Human Evolution ● Human Evolution Supplement
<b>Option 9.9: Biochemistry</b>			
1-8	The history of theoretical & experimental studies in the biochemistry of photosynthesis. Photosynthesis: the role of chlorophyll, the biochemistry of the light dependent & light independent reactions, the role of ATP. Chloroplast structure.		● Events in Biochemistry The Chemistry of Life
<b>Practical Work</b>			
	Practical work, including the use of statistics. Use of chi-squared in genetics.		● Year 11 workbook Inheritance Supplement