

# Advanced Placement Course

The Advanced Placement (AP) biology course is designed to be equivalent to a college introductory biology course. It is to be taken by students after successful completion of first courses in high school biology and chemistry. In the guide below, we have

indicated where the relevant material can be found: SB1 for Senior Biology 1 and SB2 for Senior Biology 2. Because of the general nature of the AP curriculum document, the detail given here is based on the content in the workbooks.

Topic	See workbook
<b>Topic I: Molecules and Cells</b>	
<b>A Chemistry of life</b>	
1 The chemical & physical properties of water. The importance of water to life.	SB1 The Chemistry of Life
2 The role of carbon. Structure and function of carbohydrates, lipids, nucleic acids, and proteins. The synthesis and breakdown of macromolecules.	SB1 The Chemistry of Life, Molecular Genetics, Cell Membranes
3 The laws of thermodynamics and their relationship to biochemical processes. Free energy changes.	SB1 The Chemistry of Life
4 The action of enzymes and their role in the regulation of metabolism. Enzyme specificity. Factors affecting enzyme activity. Applications of enzymes.	SB1 The Chemistry of Life
<b>B Cells</b>	
1 Comparison of prokaryotic and eukaryotic cells, including evolutionary relationships.	SB1 Cell Structure, SB2 The Origin & Evolution of Life
2 Membrane structure: fluid mosaic model. Active and passive transport.	SB1 Cell Membranes
3 Structure and function of organelles. Comparison of plant and animal cells. Cell size and surface area: volume ratio. Organization of cell function.	SB1 Cell Structure, Cell Membranes
4 Mitosis and the cell cycle. Mechanisms of cytokinesis. Cancer (tumour formation) as the result of uncontrolled cell division.	SB1 Cell Division & Organization
<b>C Cellular energetics</b>	
1 Nature and role of ATP. Anabolic and catabolic processes. Chemiosmosis.	SB1 Cellular Energetics
2 Structure and function of mitochondria. Biochemistry of cellular respiration, including the role of oxygen in energy yielding pathways. Anaerobic systems.	SB1 Cellular Energetics
3 Structure and function of chloroplasts. Biochemistry of photosynthesis. Adaptations for photosynthesis in different environments.	SB1 Cellular Energetics
<b>Topic II: Heredity and Evolution</b>	
<b>A Heredity</b>	
1 The importance of meiosis in heredity. Gametogenesis. Similarities and differences between gametogenesis in animals and plants.	SB1 Genes & Chromosomes SB2 Reproduction & Development, Plant Responses & Reproduction
2 Structure of eukaryotic chromosomes. Heredity of genetic information.	SB1 Genes & Chromosomes
3 Mendel's laws. Inheritance patterns.	SB1 Inheritance
• For this topic also see TRC: Genetics Supplement	
<b>B Molecular genetics</b>	
1 RNA and DNA structure and function. Eukaryotic and prokaryotic genomes.	SB1 Molecular Genetics
2 Gene expression in prokaryotes and eukaryotes. The <i>Lac</i> operon model.	SB1 Molecular Genetics
3 Causes of mutations. Gene mutations (e.g. sickle cell disease). Chromosomal mutations (e.g. Down syndrome).	SB1 Genes & Chromosomes
4 Viral structure and replication.	SB2 Pathogens & Disease
5 Nucleic acid technology and applications. legal and ethical issues.	SB1 Aspects of Biotechnology
• For this topic also see TRC: Genetics Supplement, Biotechnology Supplement, Replication in Bacteriophage	
<b>C Evolutionary biology</b>	
1 The origins of life on Earth. Prebiotic experiments. Origins of prokaryotic cells. Endosymbiotic theory.	SB2 The Origin & Evolution of Life

Topic	See workbook
2 Evidence for evolution. Dating of fossils.	SB2 The Origin & Evolution of Life
3 Mechanisms of evolution: natural selection, speciation, macroevolution. The species concept.	SB2 Speciation, Patterns of Evolution SB1 Classification
• For this topic also see TRC: Evolution Supplement, Ecology and Classification Supplement	
<b>Topic III: Organisms and Populations</b>	
<b>A Diversity of organisms</b>	
1 Evolutionary patterns: major body plans of plants and animals.	SB1 Classification
2 Diversity of life: representative members from the five kingdoms Monera (=Prokaryotae), Fungi, Protista (=Protoctista), Animalia and Plantae.	SB1 Classification
3 Phylogenetic classification. Binomial nomenclature. Five kingdom classification. Use of dichotomous keys.	SB1 Classification
4 Evolutionary relationships: genetic and morphological characters. Phylogenies.	SB1 Classification SB2 The Origin & Evolution of Life
• For this topic also see TRC: Animal Biology Supplement, Ecology and Classification Supplement	
<b>B Structure and function of plants and animals</b>	
1 Plant and animal reproduction and development (includes humans). Adaptive significance of reproductive features and their regulation.	SB2 Reproduction & Development, Plant Responses & Reproduction
2 Organization of cells, tissues & organs.	SB1 Cell Division & Organization
The structure and function of animal and plant organ systems. Adaptive features that have contributed to the success of plants and animals in occupying particular terrestrial niches.	SB2 Plant Structure & Adaptation, Diet & Animal Nutrition, Animal Transport Systems, Homeostasis & Excretion, Gas Exchange in Animals
3 Plant and animal responses to environmental cues. The role of hormones in these responses.	SB2 Animal Behavior, Plant Responses and Reproduction
• For this topic also see TRC: Animal Biology Supplement, Plant Biology Supplement, Behavior Supplement	
<b>C Ecology</b>	
1 Factors influencing population size. Population growth curves.	SB1 Populations
2 Abiotic and biotic factors: effects on community structure and ecosystem function. Trophic levels: energy flows through ecosystems and relationship to trophic structure. Nutrient cycles.	SB1 Ecosystems, Energy Flow & Nutrient Cycles
3 Human influence on biogeochemical cycles: (e.g. use of fertilizers).	SB1 Human Impact & Conservation
• For this topic also see TRC: Human Impact Supplement, Ecology and Classification Supplement	

## Practical Work

Integrated practicals as appropriate: see Senior Biology 1: Skills in Biology.