SCERT Kerala · Class 10 · Biology

Biology Part 1

PADIKAM
BIOLOGY
PART I
Complete Study Notes | Standard X | English Medium
SCERT Kerala 2025 syllabus coverage
Original explanations, revision tools, exam focus and practice

PADIKAM | CLASS 10 BIOLOGY - PART I
Contents
These chapters connect heredity and evolution with the nervous system and sensory experiences.
Chapter 1 | Genetics of Life
Chapter 2 | Paths of Evolution
Chapter 3 | Behind Sensations
How to use this book
• Read the chapter mission first to understand the learning target.
• Study the core notes and pause at every table, formula or process map.
• Use the exam focus list for last-minute revision.
• Answer the practice questions without looking back, then revise weak areas.
Official textbook links
SCERT Kerala Class 10 PART I
SCERT Kerala Standard 10 textbook catalogue

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CHAPTER 1
Genetics of Life
Chapter mission: explain how DNA stores information, how genes are expressed and how traits pass between generations.
DNA, genes and chromosomes
• DNA is a double-stranded nucleic acid built from nucleotides. Each nucleotide contains deoxyribose sugar, phosphate and one nitrogen base.
• A pairs with T and G pairs with C. Complementary pairing allows accurate copying and stable information storage.
• A gene is a functional segment of DNA. DNA winds around histone proteins and is packed into chromosomes inside the nucleus.
From gene to protein
• During transcription, information in a DNA gene is copied into messenger RNA.
• During translation, ribosomes read mRNA codons. Transfer RNA brings amino acids, which join into a polypeptide.
• Proteins form structures, enzymes and signals; therefore gene expression influences observable traits.
Cell division
Feature Mitosis Meiosis
Main role growth and repair gamete formation
Daughter cells two four
Chromosome number maintained halved
Variation usually low increased by recombination and assortment
Inheritance
• Alleles are alternative forms of a gene. In a diploid organism, one allele of a pair usually comes from each

parent.
• Genotype is the allele combination; phenotype is the observable outcome shaped by genotype and environment.
• A dominant allele can be expressed in a heterozygote; a recessive phenotype commonly requires two recessive alleles.
• A Punnett square predicts probability, not a guaranteed family outcome.
Variation and genetic technology
• Variation arises through mutation, recombination, random fertilisation and environmental effects.
• DNA profiling compares variable DNA regions for identification and relationship studies.
• Gene editing can make targeted DNA changes. Medical and agricultural benefits must be considered alongside safety, fairness and ecological consequences.

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Exam focus
• Draw and label nucleotide, DNA and chromosome relationships.
• Keep replication, transcription and translation distinct.
• In inheritance problems, state symbols, parental genotypes, gametes and probabilities.
Practice
1. Explain complementary base pairing.
2. Compare mitosis and meiosis.
3. Cross two heterozygous individuals for a single dominant-recessive trait.

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CHAPTER 2
Paths of Evolution
Chapter mission: describe evidence and mechanisms of evolution and relate common ancestry to biological diversity.
Evolution as population change
Evolution is a change in inherited characteristics of a population across generations. Individuals do not evolve during their lifetime; populations change as allele frequencies shift.
Sources of variation
• Mutation creates new alleles. Meiosis and sexual reproduction reshuffle existing alleles.
• Variation becomes evolution only when inherited differences affect future generations.
Natural selection
• Populations produce more offspring than the environment can support, creating competition and other selection pressures.
• Individuals vary, and some inherited variations improve survival or reproductive success in a particular environment.
• Helpful alleles tend to become more common over many generations. Fitness is always relative to the environment.
Evidence
Evidence What it can reveal
fossils past organisms and sequence of change
homologous structures common ancestry despite different functions
vestigial structures features inherited from ancestors
embryology shared developmental patterns
DNA and proteins degree of evolutionary relationship
biogeography effects of isolation and Earth history
Speciation and human evolution
• Geographical or reproductive isolation reduces gene flow. Different selection pressures and accumulated changes can eventually produce new species.
• Evolution branches like a tree; modern species share ancestors and are not arranged as a ladder of progress.
• Human evolution includes multiple related hominin groups. Fossil and molecular evidence are combined to reconstruct this history.
Exam focus

• Use population-level language in natural-selection answers.
• Differentiate homologous and analogous structures.

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• Treat evolutionary diagrams as branching relationships, not rankings.
Practice
1. Explain natural selection using antibiotic resistance.
2. How does molecular evidence support common ancestry?
3. Describe how isolation may lead to speciation.

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CHAPTER 3
Behind Sensations
Chapter mission: trace how receptors, neurons, the brain and effectors coordinate sensation and response.
The nervous pathway
• A receptor detects a stimulus and converts it into an electrical signal. Sensory neurons carry information to the central nervous system.
• The brain or spinal cord processes information. Motor neurons carry commands to muscles or glands, which act as effectors.
• A reflex is a rapid, automatic response often coordinated through the spinal cord while the brain is informed.
Neuron and synapse
• Dendrites receive signals, the cell body integrates them and the axon conducts impulses away.
• Myelin insulates many axons and increases conduction speed. Gaps in myelin help impulses travel efficiently.
• At a chemical synapse, neurotransmitter released from one neuron crosses a tiny gap and binds receptors on the next cell.
Central nervous system
Part Major role
cerebrum thinking, memory, language, voluntary action and sensory interpretation
cerebellum balance, posture and fine coordination
medulla oblongata vital involuntary activities such as breathing and heartbeat
spinal cord signal pathway and many reflexes
Vision
• The cornea and lens refract light onto the retina. The iris controls pupil size; ciliary muscles alter lens shape for focusing.
• Rods are sensitive in dim light; cones support colour vision and sharp detail. The fovea has especially high visual acuity.
• Photoreceptors convert light into signals carried through the optic nerve. The brain constructs the conscious visual experience.
Hearing, balance, smell and taste
• Sound vibrates the eardrum and ossicles. Fluid movement in the cochlea bends sensory hair cells and initiates nerve impulses.
• The semicircular canals detect rotational movement; vestibular structures help sense position and linear acceleration.
• Smell and taste are chemical senses. Molecules bind specific receptors, and the brain combines these signals strongly in flavour perception.

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Exam focus
• Trace every response in order: stimulus → receptor → neuron/CNS → motor neuron → effector.
• Label the major parts of a neuron, eye and ear with functions.
• Explain sensation as receptor conversion plus brain interpretation.
Practice
1. Describe a reflex arc.

2. Compare rods and cones.
3. Trace sound from the outer ear to a nerve impulse.

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Final Revision Checklist
• I can connect DNA structure to protein production.
• I can explain inheritance using probability.
• I can describe evolution with evidence and mechanism.
• I can trace sensory and motor pathways accurately.
Padikam Learning Content
Prepared as an independent learning companion using the SCERT textbook only as the syllabus and notation reference.