

Introduction to Zoology

Introduction to Zoology – Study Notes

1. What Is Zoology?

- **Definition:** Zoology is the branch of biology that studies animals, their structure, function, behavior, evolution, and distribution.
 - **Scope:** Includes everything from microscopic protozoa to the largest mammals, covering both living and extinct species.
 - **Relation to Other Disciplines**
 - **Ecology** – interactions of animals with each other and their environment.
 - **Evolutionary Biology** – origins and diversification of animal lineages.
 - **Physiology** – how animal bodies work.
 - **Genetics** – inheritance and molecular basis of traits.
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2. Major Subfields of Zoology

Subfield	Focus	Typical Methods
Anatomy	Gross (macroscopic) and microscopic structure of animal bodies.	Dissections, histology, imaging (CT, MRI).
Physiology	Functions of organs and systems (e.g., respiration, circulation).	Experiments on living specimens, electrophysiology, metabolic assays.
Behavioral Zoology (Ethology)	Animal behavior in natural and laboratory settings.	Field observations, video analysis, controlled experiments.
Ecology	Relationships among animals, other organisms, and abiotic factors.	Population surveys, mark-recapture, GIS mapping.
Evolutionary Zoology	Patterns and processes of animal evolution.	Phylogenetic analysis, fossil record studies, comparative genomics.
Systematics & Taxonomy	Classification, naming, and evolutionary relationships.	Morphological keys, DNA barcoding, cladistics.

Introduction to Zoology

Sub?field	Focus	Typical Methods
Parasitology	Parasites and their hosts.	Microscopy, life?cycle experiments, molecular diagnostics.
Conservation Biology	Protecting species and habitats.	Threat assessments, captive breeding, habitat restoration.

3. Basic Animal Classification

1. **Kingdom Animalia** – Multicellular, eukaryotic, heterotrophic organisms.
2. **Major Phyla (examples)**

Phylum	Representative Groups	Key Traits
Porifera	Sponges	No true tissues; filter feeders.
Cnidaria	Jellyfish, corals	Radial symmetry; stinging cells (cnidocytes).
Platyhelminthes	Flatworms	Bilateral symmetry, no body cavity.
Nematoda	Roundworms	Pseudocoelom, complete digestive tract.
Annelida	Earthworms, leeches	Segmented body, true coelom.
Mollusca	Snails, octopuses	Soft body, often with shell; muscular foot.
Arthropoda	Insects, crustaceans, spiders	Exoskeleton, jointed appendages, segmented.
Echinodermata	Sea stars, sea urchins	Pentaradial symmetry (adults), water?vascular system.
Chordata	Fish, amphibians, reptiles, birds, mammals	Notochord, dorsal nerve cord, pharyngeal slits, post?anal tail (at some stage).

4. Fundamental Concepts

4.1. Levels of Biological Organization

1. Molecule ? Cell ? Tissue ? Organ ? Organ system ? Organism ? Population ? Community ? Ecosystem ? Biosphere

4.2. Evolutionary Principles

Introduction to Zoology

- **Natural Selection** – differential survival/reproduction of individuals based on heritable traits.
- **Speciation** – formation of new species via reproductive isolation (all