Question: What is biodiversity?
Answer: Biodiversity refers to the number and types of organisms present on Earth.

Question: Approximately how many species are known and described?
Answer: Approximately 1.7-1.8 million species are known and described.

Question: What is nomenclature?
Answer: Nomenclature is the process of standardizing the naming of living organisms so that a particular organism is known by the same name all over the world.

Question: What is identification in the context of biological classification?
Answer: Identification is the process of determining the correct name and classification of an organism by describing it accurately.

Question: What is the International Code for Botanical Nomenclature (ICBN)?
Answer: The ICBN provides agreed principles and criteria for assigning scientific names to plants.

Question: What is the International Code of Zoological Nomenclature (ICZN)?
Answer: The ICZN governs the naming of animals.

Question: What is binomial nomenclature?
Answer: Binomial nomenclature is a system of providing a name with two components – the generic name and the specific epithet.

Question: Who developed the binomial nomenclature system?
Answer: Carolus Linnaeus developed the binomial nomenclature system.

Question: In the scientific name *Mangifera indica*, what does *Mangifera* represent?
Answer: *Mangifera* represents the genus.

Question: In the scientific name *Mangifera indica*, what does *indica* represent?
Answer: *indica* represents the specific epithet.

Question: What are the general rules for writing biological names?
Answer: Biological names are generally in Latin and written in italics; the first word represents the genus, the second the specific epithet; both words are underlined when handwritten; the genus name starts with a capital letter, the specific epithet with a small letter.

Question: What does "Linn." after *Mangifera indica Linn.* indicate?
Answer: "Linn." indicates that the species was first described by Linnaeus.

Question: What is classification?

Answer: Classification is the process by which anything is grouped into convenient categories based on some easily observable characters. [1]

Question: What is a taxon?
Answer: A taxon is a scientific term for a category used to classify organisms.

Question: What is taxonomy?
Answer: Taxonomy is the process of classifying organisms based on their characteristics.

Question: What are the basic processes of taxonomy?
Answer: The basic processes of taxonomy are characterization, identification, classification, and nomenclature.

Question: What is systematics?
Answer: Systematics is the study of the relationships among different kinds of organisms.

Question: What is the meaning of the Latin word 'systema'?
Answer: 'Systema' means systematic arrangement of organisms.

Question: What is a taxonomic category?
Answer: A taxonomic category is a rank or level in the hierarchical classification system.

Question: What is a taxonomic hierarchy?
Answer: A taxonomic hierarchy is the series of ranks or categories in the classification system.

Question: What are the common taxonomic categories?
Answer: The common taxonomic categories are kingdom, phylum/division, class, order, family, genus, and species.

Question: Which is the lowest category in the taxonomic hierarchy? **Answer:** Species is the lowest category.

Question: What is the basis for placing an organism in various categories?
Answer: The basic requirement is the knowledge of characters of an individual or group of organisms.

Question: What is a species in the context of taxonomy?
Answer: A species is a group of individual organisms with fundamental similarities.

Question: What is a genus?
Answer: A genus comprises a group of related species which have more characters in common compared to species of other genera.

Question: What is a family in the taxonomic hierarchy?

Answer: A family is a group of related genera with fewer similarities than genera and species.

Question: How are families characterized in plants?
Answer: Families are characterized on the basis of both vegetative and reproductive features of plant species.

Question: What is an order in biological classification?
Answer: An order is an assemblage of families which exhibit a few similar characters.

Question: What is a class in taxonomy?
Answer: A class includes related orders.

Question: What is a phylum?
Answer: In animals, a phylum is a category that includes classes with common features.

Question: What is a division in plant classification?
Answer: In plants, a division is a category similar to a phylum in animals.

Question: What is the highest category in the classification system of animals?
Answer: The highest category in the animal classification system is Kingdom Animalia.

Question: What is the highest category in the plant classification system?
Answer: The highest category in the plant classification system is Kingdom Plantae.

Question: What happens to the number of common characteristics as we go higher in the taxonomic hierarchy from species to kingdom?
Answer: The number of common characteristics goes on decreasing.

Question: What are the four categories of bacteria based on shape?
Answer: The four categories are Coccus (spherical), Bacillus (rod-shaped), Vibrium (comma-shaped), and Spirillum (spiral).

Question: What are the two main groups of bacteria?
Answer: The two main groups are Archaebacteria and Eubacteria.

Question: What are the three types of Archaebacteria?
Answer: The three types are halophiles (live in salty areas), thermoacidophiles (live in hot springs), and methanogens (live in marshy areas).

Question: What is a characteristic feature of Archaebacteria that allows them to survive in extreme conditions?
Answer: They have a different cell wall structure.

Question: What are cyanobacteria?

Answer: Cyanobacteria, also known as blue-green algae, are photosynthetic autotrophic eubacteria.

Question: What is the role of heterocysts in cyanobacteria?
Answer: Heterocysts are specialized cells that fix atmospheric nitrogen.
Question: What is the defining characteristic of organisms placed in Kingdom Protista?
Answer: All single-celled eukaryotes.

Question: Why are the boundaries of Kingdom Protista not well-defined?
Answer: Varying interpretations of photosynthetic organisms.

Question: Which groups are included under Protista in this book?
Answer: Chrysophytes, Dinoflagellates, Euglenoids, Slime moulds, and Protozoans.

Question: What is the primary habitat of Protists?
Answer: Aquatic.

Question: What is the significance of Kingdom Protista in classification?
Answer: Link with plants, animals, and fungi.

Question: What are the cellular characteristics of Protists?
Answer: Eukaryotic, defined nucleus, membrane-bound organelles. Some have flagella/cilia.

Question: How do Protists reproduce?
Answer: Asexually and sexually (cell fusion, zygote formation).

Question: Which organisms are included in Chrysophytes?
Answer: Diatoms and golden algae (desmids).

Question: Where are Chrysophytes found?
Answer: Freshwater and marine environments.

Question: What is the nature of diatoms' cell walls?
Answer: Two overlapping, silica-embedded shells.

Question: What is diatomaceous earth?
Answer: Accumulated diatom cell wall deposits.

Question: What are the uses of diatomaceous earth?
Answer: Polishing, filtration.

Question: What is the ecological role of diatoms in oceans?
Answer: Primary producers.

Question: What are the general characteristics of Dinoflagellates?
Answer: Mostly marine, photosynthetic.

Question: What determines the color of Dinoflagellates?
Answer: Pigments.

Question: What is the cell wall structure of Dinoflagellates?
Answer: Cellulose plates.

Question: How many flagella do Dinoflagellates typically have?
Answer: Two.

Question: What is a red tide and what causes it?
Answer: Rapid dinoflagellate multiplication.

Question: What is the effect of toxins released by red dinoflagellates?
Answer: Kills marine animals.

Question: Where are Euglenoids typically found?
Answer: Stagnant freshwater.

Question: What is the pellicle and what is its function?
Answer: Protein layer, flexibility.

Question: How many flagella do Euglenoids have?
Answer: Two.

Question: What is the mode of nutrition of Euglenoids?
Answer: Photosynthetic/heterotrophic.

Question: What is the similarity between pigments of euglenoids and higher plants?
Answer: Identical.

Question: What is the mode of nutrition of Slime Moulds?
Answer: Saprophytic.

Question: What is a plasmodium?
Answer: Slime mold aggregation.

Question: What happens to the plasmodium during unfavorable conditions?
Answer: Forms fruiting bodies/spores.

Question: What are the characteristics of slime mould spores?

Answer: True walls, resistant, long-lived.

Question: How are slime mould spores dispersed?
Answer: Air currents.

Question: What is the mode of nutrition of Protozoans?
Answer: Heterotrophic.

Question: What are the four major groups of protozoans?
Answer: Amoeboid, Flagellated, Ciliated, Sporozoans.

Question: How do Amoeboid protozoans move and capture prey?
Answer: Pseudopodia.

Question: What is an example of a flagellated protozoan that causes disease?
Answer: *Trypanosoma*.

Question: How do Ciliated protozoans move?
Answer: Cilia.

Question: What is an example of a ciliated protozoan?
Answer: *Paramecium*.

Question: What is a characteristic feature of Sporozoans?
Answer: Infectious spore stage.

Question: What is an example of a Sporozoan that causes a significant human disease?
Answer: *Plasmodium*.

Question: What is the basic structure of a virus?
Answer: Nucleic acid + protein coat.

Question: What is the difference between a virus and a viroid?
Answer: Viroid lacks protein coat.

Question: What is a prion?
Answer: Abnormally folded protein.
Question: What are bryophytes commonly called?
Answer: Amphibians of the plant kingdom.

Question: Why are bryophytes called amphibians of the plant kingdom?
Answer: They can live in soil but depend on water for sexual reproduction.

Question: Where do bryophytes usually grow?

Answer: Moist, shaded areas in the hills.

Question: What role do bryophytes play in plant succession?
Answer: They play an important role on bare rocks/soil.

Question: How is the plant body of bryophytes different from algae?
Answer: It is more differentiated.

Question: What structures do bryophytes use to attach to the substratum?
Answer: Rhizoids.

Question: What is the main plant body of a bryophyte?
Answer: Haploid (gametophyte).

Question: What are the male sex organs in bryophytes called?
Answer: Antheridia.

Question: What do antheridia produce?
Answer: Biflagellate antherozoids.

Question: What are the female sex organs in bryophytes called?
Answer: Archegonia.

Question: What does an archegonium produce?
Answer: A single egg.

Question: How does fertilization occur in bryophytes?
Answer: Antherozoids swim to the archegonium and fuse with the egg.

Question: What does the zygote develop into in bryophytes?
Answer: A sporophyte.

Question: Is the sporophyte of bryophytes free-living?
Answer: No, it is attached to the gametophyte.

Question: How are spores produced in bryophytes?
Answer: By meiosis in the sporophyte.

Question: What is peat, and which moss provides it?
Answer: A fuel and packing material provided by *Sphagnum* moss.

Question: What is the ecological importance of mosses?

Answer: They colonize rocks, decompose them, and prevent soil erosion.

Question: What are the two main groups of bryophytes?
Answer: Liverworts and mosses.

Question: What is an example of a liverwort?
Answer: *Marchantia*.

Question: What are gemmae, and what is their function?
Answer: Specialized structures for asexual reproduction in liverworts.

Question: Where are gemmae located?
Answer: In gemma cups on the thalli.

Question: How is the sporophyte of liverworts differentiated?
Answer: Into a foot, seta, and capsule.

Question: What are the two stages of the gametophyte in mosses?
Answer: Protonema stage and leafy stage.

Question: How does the leafy stage develop in mosses?
Answer: From the secondary protonema as a lateral bud.

Question: Where are the sex organs located in mosses?
Answer: At the apex of the leafy shoots.

Question: What are common examples of mosses?
Answer: *Funaria*, *Polytrichum*, and *Sphagnum*.

Question: What are pteridophytes commonly known as?
Answer: Horsetails and ferns.

Question: What are the evolutionary advancements of pteridophytes?
Answer: First terrestrial plants with vascular tissues (xylem and phloem).

Question: What is the dominant phase in the life cycle of pteridophytes?
Answer: Sporophyte.

Question: What are microphylls and macrophylls?
Answer: Small and large leaves, respectively, found in pteridophytes.

Question: What are sporophylls?

Answer: Leaf-like appendages that bear sporangia.

Question: What are strobili or cones?
Answer: Compact structures formed by sporophylls.

Question: What is a prothallus?
Answer: The gametophyte of pteridophytes.

Question: Why is the spread of pteridophytes limited?
Answer: They require cool, damp, shady places and water for fertilization.

Question: What are homosporous and heterosporous plants?
Answer: Plants producing similar and different kinds of spores, respectively.

Question: What are the four classes of pteridophytes?
Answer: Psilopsida, Lycopsida, Sphenopsida, and Pteropsida.

Question: What does "gymnosperm" mean?
Answer: Naked seeds.

Question: What are some characteristics of gymnosperm leaves?
Answer: Adapted to withstand extremes, needle-like in conifers.

Question: What are the two types of cones in gymnosperms?
Answer: Microsporangiate (male) and megasporangiate (female) strobili.

Question: What is the key difference between gymnosperms and angiosperms?
Answer: Gymnosperms have naked seeds, while angiosperms have seeds enclosed in fruits.
Question: What are some fundamental features used as the basis of animal classification?
Answer: Arrangement of cells, body symmetry, nature of coelom, patterns of digestive, circulatory, and reproductive systems.

Question: What is the level of organization in sponges?
Answer: Cellular level.

Question: What is the level of organization in coelenterates?
Answer: Tissue level.

Question: What level of organization do Platyhelminthes exhibit?
Answer: Organ level.

Question: What is the level of organization in annelids, arthropods, molluscs, echinoderms, and chordates?

Answer: Organ system level.

Question: What is the difference between an incomplete and complete digestive system?
Answer: Incomplete has one opening, complete has two (mouth and anus).

Question: What are the two types of circulatory systems?
Answer: Open and closed.

Question: What type of symmetry do sponges exhibit?
Answer: Asymmetry.

Question: What type of symmetry do coelenterates, ctenophores, and echinoderms have?
Answer: Radial symmetry.

Question: What type of symmetry do annelids and arthropods have?
Answer: Bilateral symmetry.

Question: What are diploblastic animals?
Answer: Animals with two embryonic layers (ectoderm and endoderm).

Question: What is mesoglea?
Answer: An undifferentiated layer between ectoderm and endoderm in diploblastic animals.

Question: What are triploblastic animals?
Answer: Animals with three embryonic layers (ectoderm, mesoderm, and endoderm).

Question: What is metameric segmentation?
Answer: Body divided into segments with serial repetition of organs.

Question: What is notochord?
Answer: A mesodermally derived rod-like structure on the dorsal side.

Question: What are chordates?
Answer: Animals with a notochord.

Question: What are non-chordates?
Answer: Animals without a notochord.

Question: What are the common names for members of phylum Porifera?
Answer: Sponges.

Question: What is the water transport system in sponges called?
Answer: Canal system.

Question: What are choanocytes?
Answer: Collar cells lining the spongocoel.

Question: How do sponges reproduce?
Answer: Asexually (fragmentation) and sexually (gametes).

Question: What are cnidoblasts or cnidocytes?
Answer: Stinging capsules in cnidarians.

Question: What are the two basic body forms of cnidarians?
Answer: Polyp and medusa.

Question: What is metagenesis?
Answer: Alternation of generation in cnidarians.

Question: What are ctenophores commonly known as?
Answer: Sea walnuts or comb jellies.

Question: What helps ctenophores in locomotion?
Answer: Ciliated comb plates.

Question: What is a characteristic feature of ctenophores regarding light?
Answer: Bioluminescence.

Question: What is the body shape of Platyhelminthes?
Answer: Dorso-ventrally flattened.

Question: What are flame cells?
Answer: Specialized cells for osmoregulation and excretion in flatworms.

Question: What is the body shape of Aschelminthes?
Answer: Circular in cross-section (roundworms).

Question: What is a pseudocoelom?
Answer: A body cavity not fully lined by mesoderm.

Question: What are some examples of Aschelminthes?
Answer: Ascaris, Wuchereria, Ancylostoma.

Question: What is the meaning of the phylum name Annelida?
Answer: Little ring.

Question: What are parapodia?
Answer: Lateral appendages in aquatic annelids.

Question: What helps in osmoregulation and excretion in annelids?
Answer: Nephridia.

Question: What is the largest phylum of Animalia?
Answer: Arthropoda.

Question: What covers the body of arthropods?
Answer: Chitinous exoskeleton.

Question: What are some examples of arthropods?
Answer: Insects, crustaceans, arachnids.

Question: What is the second largest animal phylum?
Answer: Mollusca.

Question: What is radula?
Answer: A rasping organ in the mouth of molluscs.

Question: What are the two main types of root systems?

Answer: Tap root system and fibrous root system.

Question: What is the primary root in dicotyledonous plants called?

Answer: Tap root.

Question: Where do fibrous roots originate from?

Answer: The base of the stem.

Question: What are adventitious roots? Give an example.

Answer: Roots that arise from parts of the plant other than the radicle. Example: Grass, Monstera, Banyan tree.

Question: What are the main functions of the root system?

Answer: Absorption of water and minerals, anchorage, storage of food, synthesis of plant growth regulators.

Question: What protects the root apex?

Answer: Root cap.

Question: What is the region of meristematic activity in the root?

Answer: The area just above the root cap, where cells divide rapidly.

Question: What is the function of the region of elongation in the root?

Answer: Responsible for the growth of the root in length.

Question: Where do root hairs develop from?

Answer: The region of maturation.

Question: What are the distinguishing features of a stem?

Answer: Bears branches, leaves, flowers, and fruits; develops from the plumule; has nodes and internodes; bears buds.

Question: From what does the stem develop?

Answer: Plumule of the embryo.

Question: What are nodes and internodes?

Answer: Nodes are the regions where leaves are born; internodes are the portions between two nodes.

Question: What are the main functions of the stem?

Answer: Spreading out branches, conducting water and minerals and photosynthates, storage of food, support, protection, vegetative propagation.

Question: What are the three main parts of a typical leaf?

Answer: Leaf base, petiole, and lamina.

Question: What are stipules?

Answer: Small, leaf-like structures at the leaf base.

Question: What is the function of the petiole?

Answer: Holds the blade to light.

Question: What is the lamina?

Answer: The green, expanded part of the leaf (leaf blade).

Question: What is the midrib?

Answer: The prominent vein in the middle of the leaf.

Question: What is venation?

Answer: The arrangement of veins and veinlets in the lamina.

Question: What are the two main types of venation?

Answer: Reticulate and parallel.

Question: What is the difference between a simple and compound leaf?

Answer: Simple leaf has an entire lamina; compound leaf has a lamina divided into leaflets.

Question: What are the two types of compound leaves? Give examples.

Answer: Pinnately compound (e.g., neem) and palmately compound (e.g., silk cotton).

Question: What is phyllotaxy?

Answer: The pattern of arrangement of leaves on the stem.

Question: What are the three main types of phyllotaxy?

Answer: Alternate, opposite, and whorled.

Question: What is a flower?

Answer: A modified shoot meant for sexual reproduction.

Question: What is inflorescence?

Answer: The arrangement of flowers on the floral axis.

Question: What are the two major types of inflorescences?

Answer: Racemose and cymose.

Question: What is the difference between racemose and cymose inflorescences?

Answer: Racemose has continuous growth with acropetal flower arrangement; cymose has limited growth with basipetal flower arrangement.

Question: What are the four whorls of a typical flower?

Answer: Calyx, corolla, androecium, and gynoecium.

Question: What are accessory and reproductive organs of a flower?

Answer: Accessory: Calyx and corolla; Reproductive: Androecium and gynoecium.

Question: What is perianth?

Answer: When calyx and corolla are not distinct, they are termed perianth.

Question: What are actinomorphic and zygomorphic flowers?

Answer: Actinomorphic: Radially symmetrical; Zygomorphic: Bilaterally symmetrical.

Question: What are hypogynous, perigynous, and epigynous flowers?

Answer: Hypogynous: Ovary superior; Perigynous: Ovary half-inferior; Epigynous: Ovary inferior.

Question: What are the parts of a stamen?

Answer: Filament and anther.

Question: What is a carpel?

Answer: The female reproductive unit of a flower, consisting of stigma, style, and ovary.

Question: What is placentation?

Answer: The arrangement of ovules within the ovary.

Question: What are the different types of placentation?

Answer: Marginal, axile, parietal, free central, basal.

Question: What is a fruit?

Answer: A mature or ripened ovary.

Question: What is a drupe? Give examples.

Answer: A type of fleshy fruit with a single seed and a hard endocarp. Examples: Mango, coconut.

Question: What are the parts of a seed?

Answer: Seed coat and embryo.