

PLANT TAXONOMY

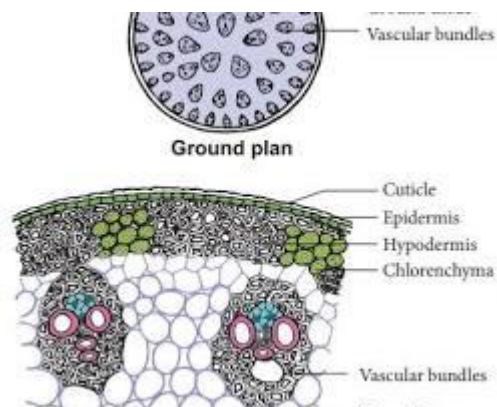
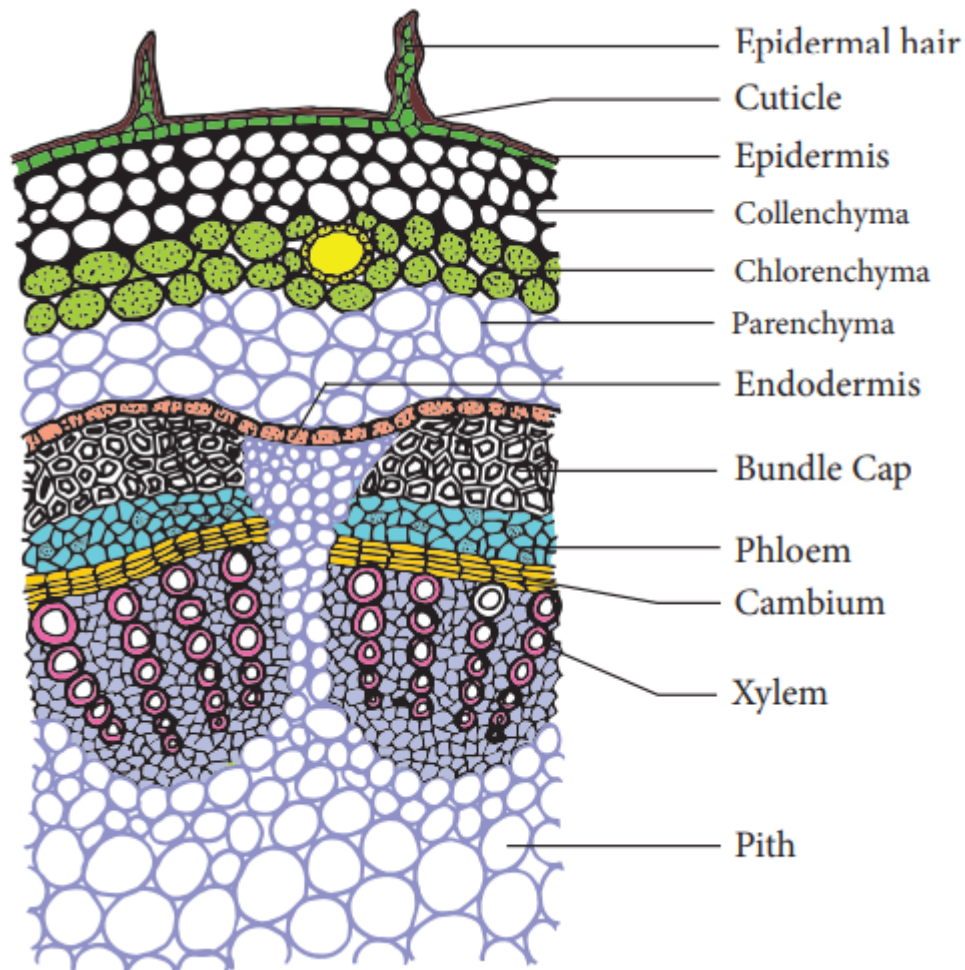
1. If names were abandoned for identification and classification, it would lead to confusion and hinder effective communication in the scientific community, impeding the study of organisms.
2. The major aims of taxonomy include understanding biodiversity, providing a systematic framework for classification, aiding in species identification, and establishing evolutionary relationships among organisms.
3.
 - i. Division: -phyta
 - Class: -opsida
 - Order: -ales
 - Family: -aceae
5. Scientific names are preferred in taxonomy because they provide a standardized, universally understood means of communication, avoiding confusion that may arise from different common names in various regions.
6. Taxonomists standardized the system of nomenclature to ensure consistency, clarity, and accuracy in the naming and classification of organisms, fostering effective communication among scientists.
7. Taxonomy is the foundation for other biological disciplines because it provides the framework for understanding and organizing the diversity of life, serving as a basis for ecological, evolutionary, and genetic studies.
8. The four phases of taxonomic study are observation and collection, classification, identification, and nomenclature.
9. Taxonomic fundamentals include morphology, anatomy, cytology, embryology, and molecular biology, providing essential tools for species identification and classification.
10. Artificial classification is based on easily observable external characteristics, while natural classification reflects evolutionary relationships, considering both external and internal characteristics.
11. Flora refers to the plant life of a particular region, while flora refers to the collective plant species in a specific area.
12. Alpha taxonomy involves the identification and naming of individual species, while omega taxonomy focuses on broader evolutionary patterns and relationships.

PLANT ANATOMY

13. Morphogenesis refers to the process of development and formation of the shape and structure of an organism.

14. Gymnosperms are economically important for timber production, paper manufacturing, and as a source of ornamental plants.

15. Monocot stems have scattered vascular bundles, while dicot stems have a ring arrangement of bundles. [Dicot Diagram here]



[Monocot Diagram here]

16. The main components of a plant cell are the cell wall, cell membrane, cytoplasm, nucleus, vacuole, and plastids.

17. The progressive change from meristematic tissue to complex tissues in the adult plant is called differentiation.

18. Embryonic tissues in the mature plant body are known as permanent tissues.

19.

- Cells: Basic structural and functional units
- Tissue: Group of cells with a common function
- Organ: Structure composed of tissues, serving a specific function
- System: Group of organs working together in a coordinated manner

20. Various parenchymatous tissues in a plant body include palisade parenchyma, spongy parenchyma, and aerenchyma.

21. Meristem is undifferentiated tissue with active cell division. Two main types are apical meristem (at tips) and lateral meristem (at sides).

22. Xylem transports water and minerals upward, while phloem transports nutrients (mainly sugars) downward.

23. Xylem tissue is made up of

- a. vessels
- b. tracheids
- c. fibers
- d. parenchyma cells

24. Phloem tissue is made up of

- a. sieve tubes
- b. companion cells
- c. fibers
- d. parenchyma cells

25. Epigeal germination occurs above the soil, while hypogeal germination occurs below the soil.

26. Conditions necessary for seed germination include water, proper temperature, oxygen, and sometimes light.

27. Pollination is the transfer of pollen from male to female reproductive organs, while fertilization is the fusion of male and female gametes.

28. Cryptogams reproduce via spores and include non-seed plants like mosses, ferns. Phanerogams produce seeds and include gymnosperms and angiosperms.

29. Club mosses share vascular tissue, sporangia, and a dominant sporophyte phase with seed plants.

30. Phanerogams are divided into Gymnosperms and Angiosperms.

31. Floral parts in a complete flower: sepals, petals, stamens, and carpels.

Animal Taxonomy/Physiology

32. Animals are classified to understand relationships, aid in identification, and provide a systematic framework for studying biodiversity.

33. Trinomial nomenclature includes subspecies, while binomial has only genus and species names.

34. Rules of scientific nomenclature include using Latinized names, italicizing or underlining, and providing a type specimen.

35. Mammals exhibit diverse characteristics, including fur/hair, mammary glands, and a warm-blooded metabolism.

36. The utilitarian scheme emphasizes practical benefits, while the phylogenetic scheme focuses on evolutionary relationships. The choice depends on the context and purpose.

37. Species concepts include biological, morphological, and ecological. Biological: based on reproductive isolation.

38. Principal taxa of mammals based on reproductive pattern: monotremes, marsupials, and eutherians.

39.

- (a) Bilateral - Symmetry with a single plane of symmetry
- (b) Radiata - Animals with radial symmetry

- (c) Acoelomata - Animals without a body cavity
- (d) Pseudocoelomata - Animals with a false body cavity
- (e) Coelomate - Animals with a true body cavity

40. Physiology is the study of normal body functions. Excretion in protozoa involves contractile vacuoles, while in mammals, it occurs through specialized organs like kidneys.

41. Functions:

- (a) Liver - Metabolism, detoxification
- (b) Lacteal - Absorption of fats
- (c) Skin - Protection, temperature regulation
- (d) Fallopian tube - Site of fertilization
- (e) Dendrites - Receive signals in neurons.

42. Asexual reproduction involves a single parent, producing genetically identical offspring. Sexual reproduction involves two parents, promoting genetic diversity.

Embryology

43. Fertilization is crucial for the fusion of male and female gametes, initiating embryonic development.

44. Cleavage is rapid cell division without cell growth. Types depend on the distribution of yolk and influence embryonic development.

45.

(a) Holoblastic - Complete cleavage with little yolk

(b) Meroblastic - Incomplete cleavage with a significant amount of yolk

46. Organogeny is the development of organs. Organs produced from mesoderm include muscles, bones, and circulatory system components.

47. Epiboly involves the spreading of cells over the embryo's surface, while invagination is the inward folding of cell sheets during gastrulation.

HISTOLOGY

48. The aim of studying histology is to understand the structure and function of tissues at a microscopic level.

49. Histopathology developed due to the need to study diseases at a cellular and tissue level.

50. Steps in tissue preparation for permanent histological slides include fixation, dehydration, embedding, sectioning, staining, and mounting.

51. Basic dyes bind to acidic components, while acid dyes bind to basic components.

52. Histological methods include light microscopy, electron microscopy, and immunohistochemistry. Immunohistochemistry involves using antibodies to detect specific proteins.

53. The advantages of using chemically preserved tissues in histology include better preservation of cellular structures and avoidance of decay.

54.

- Histochemistry: Study of chemical components in tissues

- Cytochemistry: Study of chemical components in cells

55. Somatic tissues include epithelial, connective, muscle, and nervous tissues. They vary in location and function.

56. Criteria for classifying somatic tissues include cell structure, arrangement, and function.

57. The incorrect statement is (b) Muscle is the only tissue with the special power of contraction.

58. A pseudo-stratified epithelium appears layered but is a single layer of cells. Stratified epithelium has multiple layers.

59. The transmission of stimulus and impulse in a nerve fiber involves depolarization, action potential, and neurotransmitter release.

60. Theories of the origin of chordates include the echinoderm theory and the enterocoel theory. Two characteristic features are the notochord and dorsal nerve cord.

61. Differentiate, with the aid of a diagram, Cephalospidomorpha, Chondrichthyes, and Osteichthyes.

Feature	Cephalospidomorpha	Chondrichthyes	Osteichthyes
Skeletal structure	Cartilage	Cartilage	Bone
Jaws	Absent	Present	Present
Paired fins	Absent	Present	Present
Scales	Cycloid scales	Placoid scales	Cycloid and ganoid scales
Gill structure	Numerous gill slits	5-7 pairs of gill slits	4 pairs of gill slits
Internal fertilization	Yes	Yes	No
Examples	Lampreys, hagfish	Sharks, rays, skates	Trout, salmon, tuna

62. Four orders of reptiles:

- Chelonia (turtles)
- Squamata (lizards, snakes)
- Crocodilia (crocodiles, alligators)
- Rhynchocephalia (tuatara)

63. Repeated question. Please refer to the previous response.

64.

- (a) Oviparous - Lay eggs externally, ovoviviparous - Retain eggs internally until hatching
- (b) Ectothermy - Reliance on external heat, endothermy - Ability to regulate internal temperature
- (c) Hibernation - Winter dormancy, aestivation - Summer dormancy

65. The advantages depend on context. For example, oviparity can protect eggs from predators, while viviparity allows parental care.

66. General characteristics of mammals include hair or fur, mammary glands, a four-chambered heart, and endothermy.

67. Musculature in vertebrates involves skeletal, smooth, and cardiac muscles, providing movement, support, and organ function.

68. Features for the progression of amphibians from aquatic to terrestrial life include lungs for aerial respiration and limbs for movement on land.

69. Amphibians are absent in Antarctica due to its harsh climate and lack of suitable habitats for amphibian life stages.

70. Characteristic features of amphibian and reptilian skin include permeability to water in amphibians and protective scales in reptiles.

71. Central nervous system in amphibians: Brain and spinal cord. Mammalian features of monotremes include laying eggs.

72. Economic importance of amphibians includes insect control, medical research, and use in ecological studies.

73. Functions of coprodaeum, urodaeum, and proctodaeum in reptiles: Coprodaeum receives feces, urodaeum receives urine, and proctodaeum stores undigested food before elimination.

74. Adaptations for water conservation in reptiles include efficient kidneys, concentrated urine, and reduced reliance on metabolic water.

75. Common characteristics shared by birds and reptiles include scales on legs, amniotic eggs, and a vertebral column.

76. Two basic categories of flight modification in birds: Wing shape modification and skeletal adaptations. An example is the alula for improved control.

77. Types of feathers in birds: Contour feathers for flight and down feathers for insulation. Functions include lift and insulation.

78. Internal fertilization in mammals provides protection for developing embryos and ensures a higher chance of survival.

79. Subphyla of Arachnida: Chelicerata (spiders, scorpions), Myriapoda (millipedes, centipedes), Hexapoda (insects).

80. Mammals are considered more advanced due to their complex brain, adaptability, and varied reproductive strategies.

81. Closed circulation is a circulatory system where blood flows within vessels and is distinct from the interstitial fluid.

82. Ear bones in amphibians: Columella. In reptiles: Stapes. In birds: Columella. In mammals: Incus, malleus, stapes.

83. Schwann cells in myelinated nerves provide insulation, allowing faster nerve impulse transmission.