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CLASS 9 SCIENCE NOTES

Diversity in Living Organism



Key
NOTES

Important
QUESTIONS

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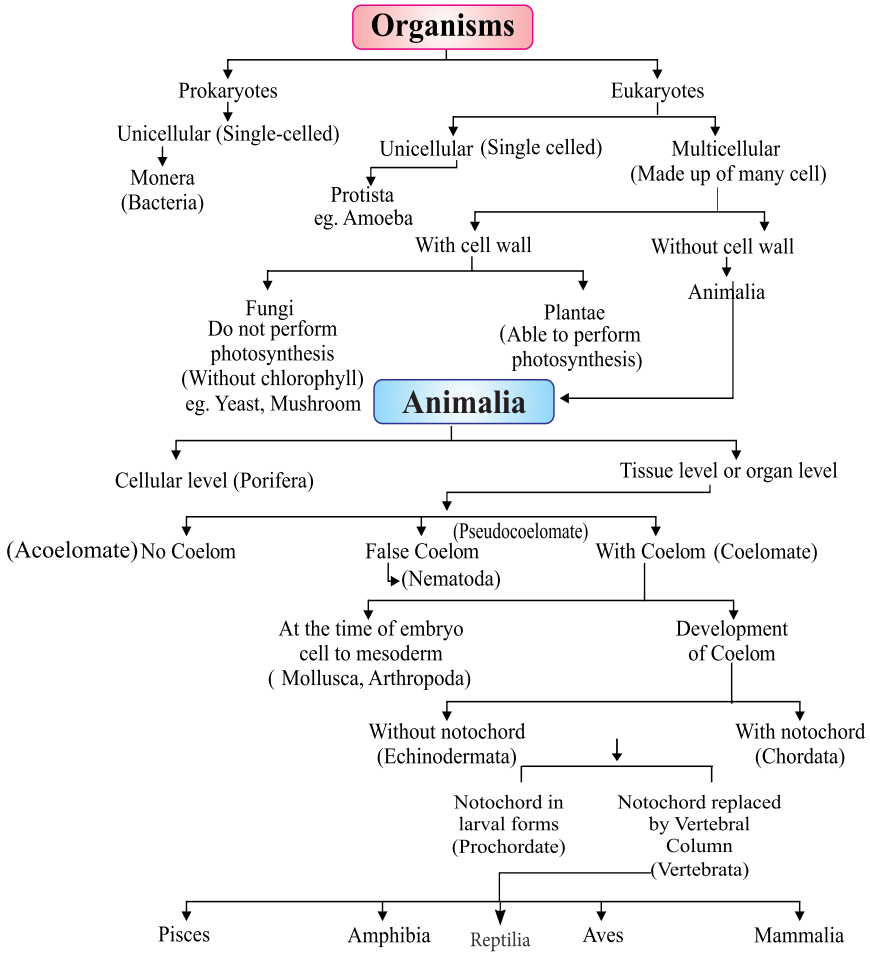


Chapter - 7

Diversity in Living
Organism

CONCEPT MAPPING

All living organism are grouped on the basis of their similarities and increasing complexities into different category.



Hierarchy of Classification :

Kingdom → Phylum → Class → Order → Family → Genus → Species → Division (in plants)

Biodiversity means the variety of living organisms present in a particular region. There are about 20 lac organisms known on the earth which differ from one another in external form, internal structure, mode of nutrition, habitat etc.

Taxonomy : It is a branch of biology which deals with identification. nomenclature and classification of organisms. Carolus Linnaeus is called as the father of taxonomy.

Nomenclature : It is a system of assigning scientific names to the organisms. An organism can have different names in different languages. This creates confusion in naming organism. A scientific name is needed which is same in all languages. Binomial nomenclature system given by Carolus Linnaeus is used for naming different organisms

Following are some (rules and norms) conventions to be followed in writing the scientific name of an organisms:

The Name consist of two part : genus and species.

(1) Genus should be written first followed by the species.

(2) First letter of the genus should be capital and that of the species should be in small letter.

(3) When printed the scientific name should be written in italics and when written with hands genus and species should be underlined separately.
Example : Homo sapiens for Human and Panthera tigris for Tiger.

Classification : The method of arranging organisms into groups or sets on the basis of similarities and differences in called classification.

Evolution : Evolution is a slow and continuous process during which early organism on earth emerged, adapted and diversified into various form.

Charles Darwin first described the idea of evolution in 1859 in his book 'The origin of species'.

Importance of Classification

- It makes the study of wide variety of organisms easy and in systematic manner.
- It helps to understand how the different organisms have evolved with time.
- It forms a base for the study of other biological sciences, like biogeography.

Basis of Classification

- There are certain features or properties used for the classification of living organisms which are known as characteristics. Organisms with same characteristics are placed in same groups.

Hierarchy of classification : Linnaeus proposed a classification system by arranging organisms into taxonomic groups at different levels according to the characteristics they have. The groups or the levels from top to bottom are :

Kingom ⟶ Phylum (in Animal) Division (in plant) ⟶ Class ⟶ Order ⟶ Family ⟶ Genus ⟶ Species.

Classification System

- **1. Two kingdom classification :** Carolus Linnaeus in 1758 classified the living organisms into two groups as plants and animals.
- **2. Five kingdom classificatoin :** R. Whittaker in 1959 further classified the organisms into five kingdoms as Fungi,Plantae, Animalia, Monera, Kingdom Protista.

Note : *Carl Woese in 1977 further divided kingdom Monera into archaebacteria (or Archae) and Eubacteria (or Bacteria).*

Basis of classification :

- **Type of cellular structure**
  - **(a) Prokaryotic cells :** These are primitive and incomplete cells without well-defined nucleus.
  - **(b) Eukaryotic cells :** These are advanced and complete cells with well-defined nucleus
- **Level of organisation**
  - **(a) Cellular Level :** All living things are made up of cells. These are structural and functional unit of life.
  - **(b) Tissue level :** The cells organised to form tissue. A tissue is a group of cells which are similar in structure and perform a specific function.
  - **(c) Organ level :** Many tissues combine to form an organ, which performs a particular function.
  - **(d) Organ system level :** Group of organs work together to perform life activities. e.g., the organs of digestive system work together to digest food.
- **Body Structure**
  - **(a) Unicellular organisms :** These are organisms made up of single cell with all activities performed by the single cell.
  - **(b) Multicellular organisms :** These are organisms made up of large number of cells with different functions performed by different cells.
- **Mode of Nutrition (obtaining food)**
  - **(a) Autotrophs :** These are the organisms that make their own food by photosynthesis.
  - **(b) Heterotrophs :** These are the organisms which depend on other organisms for food.

FIVE KINGDOM CLASSIFICATIONS

MONERA (Unicellular Prokaryotes)	PROTISTA	FUNGI	PLANTAE	ANIMALIA
1. No defined nucleus.	1. Unicellular, eukaryotes.	1. Eukaryotic, multicellular.	1. Eukaryotic	1. Eukaryotic
2. No well defined cell organelles.	2. Hair like cilia, flagella for movement.	2. Hetrotrophic nutrition.	2. Multicellular	2. Multicellular
3. Nutrition-Autotrophic & Heterotrophic (Autotrophic – made by self, Hetero – made by others)	3. Nutrition – Autotrophic or heterotrophic.	3. Consume organic decaying material called saprophytes.	3. Autotrophs – Contain chlorophyll, do photosynthesis.	3. Heterotrophs
Examples – Bacteria, Blue-green algae (cyano bacteria), mycoplasma etc.	Examples – Unicellular, algae, diatoms and protozoans etc.	4. Cell made up of cell wall of tough complex sugar called chitin. Examples – Penicillium, Aspergillus, Agaricus etc.	4. Cells have cell walls.	4. Without cell wall.Further divided into 10 sub-groups on the basis of extent and type of body design differentiation. Examples – Tiger, peacock, ant, insects, fishes and earthworm etc.
			5. All the green plants are there. Further divided into five sub-groups on the basis of : (a) Plant body well differentiated or not. (b) Special tissue for the transport of water are there or not. (c) Bear seeds, whether naked or enclosed within fruits. Examples – Pinus, algae, funeria, Mangifera indica etc.	

Kindom I : MONERA

(i) Prokaryotic, unicellular, autotrophic or heterotrophic

(ii) May or may not have cell wall which is rigid and made up of peptidoglycan.

(iii) *Examples :* Anabaena, Bacteria, Cyano-bacteria or Blue-green algae (autotrophic).



BACTERIA



ANABAENA

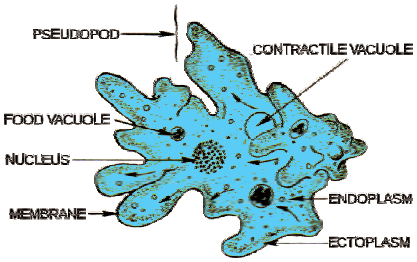
Kingdom II : PROTISTA

(i) Eukaryotic, unicellular.

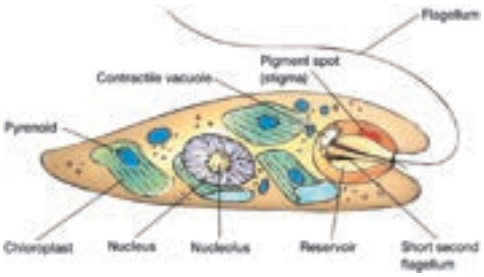
(ii) Can be autotrophic or heterotrophic.

(iii) May have cilia, flagella or pseudopodia for locomotion.

(iv) *Examples :* Plants like unicellular algae, diatoms; animals like protozoans (Amoeba, Paramecium, Euglena); fungi like slime molds and water moulds.



AMOEBA



EUGLENA

Kingdom III : FUNGI

(i) Eukaryotic, cell wall is made up of chitin.

(ii) Mostly multicellular but sometimes unicellular (yeast).

(iii) Mode of nutrition :

(a) **Mostly saprophytes :** These organisms use dead and decaying organic material for food.

(b) **Some parasitic :** These organisms live inside or outside the body of other living organism to have food and can be disease causing.

(c) **Symbiotic relation :** These are relations between two organisms in

Which they live together for benefit of one or both. Lichens are a symbiotic relation between a fungi and cynobacteria/algae. Here fungi gets food from cyanobacteria and in return cyanobacteria gets water mineral and protection from fungi.

(iv) *Examples :* Mushrooms (Agaricus), green mould (Penicillium), smut (Aspergillus), yeast



PENICILLIUM



AGARICUS

Kingdom IV : PLANTAE

(i) Eukaryotic, multicellular.

(ii) Autotrophs. Some may be heterotrophs also

(iii) Cell wall is made up of cellulose and hemicellulose.

Kingdom Plantae further classified into 5 division based on following (features) basis

(a) **Differentiated body parts :** Body is differentiated into leaves stems, roots, flowers, etc.

(b) **Presence of vascular tissue :** There are two types of vascular tissues present in the plants :

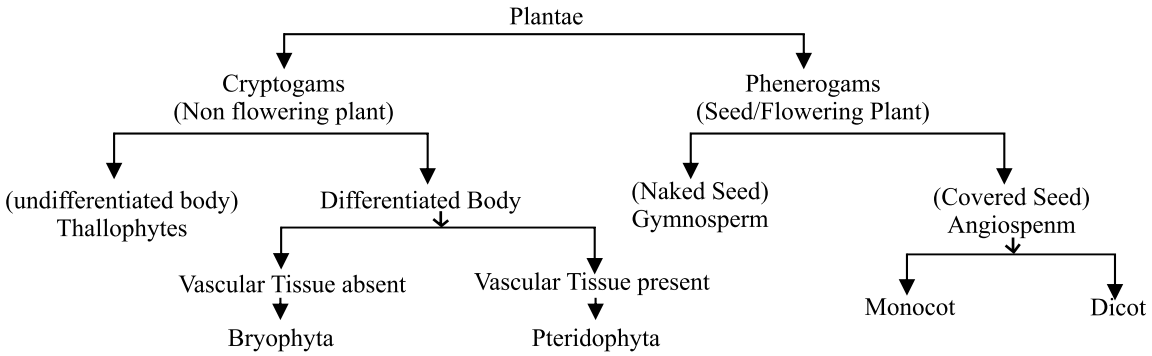
- **Xylem :** Helps in transport of water & Minerals.
- **Phloem :** Helps in transport of food.

(c) **Reproduction through seeds or spores :**

- **Phanerogam :** Plants with seeds are called phanerogam. They contains embryo with stored food and are multicellular.
- **Cryptogam :** Plants reproduce by spores, without flower and seeds. They contains only naked embryo.

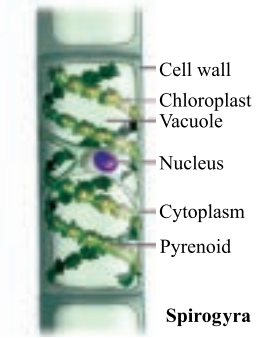
(d) Seeds are naked or covered (fruit) :

- **Angiospermae :** These are plants with seeds inside the fruit and bears flowers.
- **Gymnospermae :** These are plants with naked seeds and do not bear flowers or fruit.



Division 1 : Thallophyta

(i) Basic and elementary plants with undifferentiated body parts.
(ii) Generally called algae.
(iii) No vascular tissue present.
(iv) Reproduce through spores.
(v) Mainly found in water (aquatic)
(vi) Example : Ulva, Spirogyra, Ulothrix, Cladophora, Chara.



Spirogyra


ULVA

Division 2 : Bryophyta

(i) Body structure differentiated but not fully developed.
(ii) No vascular tissues present.
(iii) Reproduce through spores.
(iv) Found on both land and water therefore known as **'Amphibians of Plantae Kingdom'.**

(v) *Example :* Liverwort (Marchantia, Riccia), Mosses (Funaria), Hornwort (Dendrocerous).



FUNARIA



RICCIA

Division 3 : Pteridophyta

(i) Differentiated body structure - leaves, stems, roots, etc.

(ii) Vascular tissues present are incomplete.

(iii) Reproduce through spores.

(iv) *Examples :* Marsilea, Fern, Horsetails.



MARSILEA



FERN

Division 4 : Gymnosperms

(i) Differentiated body parts i.e. leaves, stem and root etc.

(ii) Vascular tissues present (incomplete)

(iii) Naked seeds without fruits or flowers.

(iv) Perennial, evergreen and woody.

(v) *Examples :* Pines (deodar), Cycas, Ginkgo.



PINUS



CYCAS

Division 5 : Angiosperms

(i) Also known as flower-bearing plants.

(ii) Later on flower becomes fruit after fetilization

(iii) Seeds are inside the fruit.

(iv) Plant Embryos in seeds have structure called cotyledons. They are also called seed leaves because in many plants they emerge and become green when they germinate.

(v) Vascular Tissue present (Complete)

Angiosperms are further divided (on the basis of number of cotyledons) into two kind :

(a) Monocot (b) Dicots.

S. No.	Features	Monocots	Dicots
1.	Seed	One cotyledon	Two cotyledons
2.	Root	Fibrous root	Prominent primary root
3.	Stem	False or hollow	Strong
4.	Leaf	Parallel venation	Reticulate venation
5.	Flower (petals)	Three or multiple of three (Trimerous)	Five or multiple of five (pentamerous)
6.	Example	Wheat, Rice etc.	Potato, Sunflower. Peanuts, Beans, Mango etc.

Kingdom V : ANIMALIA

Basis of classification of Animalia kingdom :

(i) Symmetry :

(a) Bilateral symmetry : It is when an organism can be divided into right and left equal halves, identical but mirror images, by a single vertical plane.

(b) Radial symmetry : It is when an organism is equally spaced around a central point, like spokes on a bicycle wheel.

(ii) Germ layers : In embryonic stages there are different layers of cells called germ layer. The three different types of germ layer are :

- **Ectoderm :** It is the outermost layer which forms nail, hair, epidermis, etc.
- **Endoderm :** It is the innermost layer which forms stomach, colon, urinary, bladder, etc.
- **Mesoderm :** It is the middle layer between ectoderm and endoderm which forms bones, cartilage, etc.

So, according to the number of germ layers present in embryonic stage, animal could be :

- **Diploblastic :** Organisms which are derived from two embryonic germ layers (ecto and endo).
- **Triploblastic :** Organisms which are derived from all the three embryonic germ layers. (ectoderm, mesoderm and endoderm)

(iii) Coelom : Body cavity or coelom is important for proper functiong of various organs. For example heart which has to contract & expand needs some cavity or empty space, which is provided by the coelom. (Coelom is the empty space occupied by different organ system in complex organism).

On the basis of presence or absence of coelom, organisms are divided into :

- **Acoelomates :** These are the simple organisms having no body cavity. e.g., Coelentrata, Platyhelminthes
- **Coelomates :** These are complex organisms having true cavity lined by mesoderm from all sides. e.g., Annelida, Mollusca, Arthropoda etc.
- **Pseudo coelomate :** These are organisms having false coelom. They have pouches of mesoderm scattered between endoderm and ectoderm. e.g., Nematoda

(iv) Notochord : It is a long rod like structure, which runs along the body between nervous, tissue and gut and provides place to muscle to attach for ease of movement.

Organisms could be :

- Without notochord – Non Chordate
- with notochord – Protochordate
- with notochord in initial embryonic stages and vertebral column in adult phase – Vertebrates

Phylum 1 : Porifera or Sponges

(i) Cellular level of organization. (They have porous body).
(ii) Non-motile animals (sessile)
(iii) Holes on body which led to a canal system for circulation of water and food
(iv) Hard outside layer called as skeletons
(v) Examples: Sycon, Spongilla, Euplectella



SYCON



EUPLECTELLA

Phylum 2 : Coelenterata

(i) Tissue level of organization
(ii) No coelom (acoelomates)
(iii) Radial symmetry, diploblastic
(iv) Hollow gut
(v) Can move from one place to another
(vi) Examples : Hydra, (Sea anemone, Jelly fish (solitary), Corals (Colonies)



SEA ANEMONE



CORALS

Phylum 3 : Platyhelminthes

(i) Also called flat worms
(ii) No coelom present (Acoelomates)
(iii) Bilateral symmetry, triploblastic
(iv) Free living or parasitic
(v) Digestive cavity has one opening for both ingestion and egestion
(vi) Examples : Planaria (free living), Liver fluke (parasitic)



PLANARIA



LIVER FLUKE

Pylum 4 : Nematoda

(i) No true coelom (Pseudocoelomate)
(ii) Triploblastic, bilateral symmetry
(iii) They are Parastic worm.
(iv) Male and female distinct from each other eg. Ascaris, Hookworm, Pinworm etc.

Phylum 5 : Annelida

(i) Second largest phylum

(ii) Coelom present (Coelomate)

(iii) Bilateral Symmetry, Triploblastic

(iv) The body is metamerically segmented (segments specialized for different functions)

(v) Live both in water and on land (acquatic or terristrial habitat)

(vi) Extensive organ differentiation

(vii) *Examples :* Earthworm, Leech, Nereis



EARTHWORM



NEREIS

Phylum 6 : Arthropoda (Jointed legs)

(i) Largest phylum (consists of 80% of species)

(ii) Generally Known as insects

(iii) True Coelom present, body is divided into 3 Region - head, thorax & abdomen.

(iv) Bilateral symmetry, triploblastic

(v) Tough exo-skeleton made up of chitin

(vi) Jointed appendages like feet, antenna

(vii) *Examples :* Prawn, Scorpion, Cockroach, Housefly, Butterfly, Spider



Spider



Ant



Prawn

Phylum 7 : Mollusca

(i) Coelom present
(ii) Triploblastic, bilateral symmetry
(iii) Soft body, sometimes covered with hard shell
(iv) Generally un segmented
(v) Muscular foot for movement
(vi) Kidney like organ for excretion
(vii) *Examples:* Chiton, Octopus, Pila, Unio



CHITON



OCTOPUS

Phylum 8 : Echinodermata (Spiny skin)

(i) Spiny skin, marine
(ii) Notochord absent
(iii) Coelom present, triploblastic, bilateral symmetry or radial symmetry
(iv) Endoskeleton of calcium carbonate
(v) Water vascular system for locomotion
(vi) *Examples :* Antedon, Sea cucumber, Star fish, Echinus



SEA CUCUMBER



STARFISH

Earlier it was placed under phylum chordata but now it is placed as a separate phylum under non chordata.

Phylum 9 : Hemichordata

(i) Small group of marine animals
(ii) Cylindrical, bilateral symmetry, triploblastic
(iii) Coelom present
(iv) Gills for respiration
(v) *Examples :* Balanoglossus



BALANOGLOSSUS

Phylum 10 : Chordata

(i) Bilateral symmetry, triploblastic
(ii) Coelom present with organ system level of organisation
(iii) Notochord present
(iv) Gills present at some stage of life
(v) Dorsal nerve chord present
(vi) Post anal tail present at some stage of life, for example, in humans in embryonic stages.

Sub-divided into two :

(a) Protochordata

- Notochord at some stage of life.
- Marine
- Examples : Herdmania, Amphioxus

(b) Vertebrata

- Notochord converted to vertebral column

- Organs like kidney for excretion and osmoregulation
- Paired appendages (eg.fins or limbs)
- 2, 3, 4 chambered heart examples : Humans (4-chambered), frog (3-chambered), fishes (2-chambered)

Vertebrates are divided into five classes namely Pisces, Amphibia, Reptilia, Aves and Mammalia.

- **Warm blooded organisms :** These are organisms which maintain same body temperature irrespective of outside temperature. *Example:* Humans beings. Human's body temperature is approximately 37°c.
- **Cold blooded organisms :** These are organisms which change their body temperature as per surrounding temperature. *Example :* Frog.

(i) Pisces (Fishes)

- Their skin is covered with scales or plates.
- They respire using gills.
- They have streamlined body and fins which help them to move in water.
- They are cold blooded and their heart has only two chambers.
- They lay eggs from which the young ones hatch out (oviparous) but some may be viviparous.
- Fishes with cartilage skeleton called **cartilaginous fishes**

  Example : Shark, Sting ray.
- Fishes with bony skeleton are called bony fishes.

  Example – Rohu


STING RAY


SHARK


TUNA


ROHU

(iii) Amphibia (Amphibians)

- They are found both in water and on land. They need water for completion of life cycle.
- They do not have scales but have mucous glands on their skin.
- They are cold blooded and the heart is three chambered.
- Respiration is through gills or lungs. They lay eggs in water.
- Frogs, Toads, Salamanders etc.



FROGS



TOADS



SALAMANDER

(iv) Reptilia (Reptiles)

- They have scales as exoskeleton and breathe through lungs.
- They are cold blooded.
- Most of them have three chambered heart but crocodiles have four chambered heart.
- They lay eggs with hard covering, on land.
- Example :- Snakes, Turtles, Lizards, Crocodiles etc.



SNAKE



CROCODILE



LIZARD

(v) Aves (Birds)

- They are warm blooded animals.
- They have four chambered heart.
- They breathe through lungs. Have hollow Bones (Pneumatic bones) that help in flying.
- They have an outer covering of feathers (Exoskeleton)
- Their two fore limbs are modified into wings for flying. They lay eggs.
- Example :- Crow, Sparrow, Pigeon, Duck, Stork , Ostrich etc.



DUCK



PIGEON



OSTRICH

(vi) Mammalia (Mammals)

- They are warm blooded animals.
- They have four chambered heart.
- They have mammary glands for production of milk to nourish their young ones.
- The skin has hairs and sweat glands. Most of them give birth to their young ones.
- Some of them lay eggs (like Platypus and Echidna).
- *Example :* Cat, Rat, Dog, Lion, Tiger, Whale, Bat, Humans etc.



Cat



Lion



Human beings



bat

Sr. No.	Features	Pisces	Amphibian	Reptilia	Aves	Mammalia
1.	Habitat	Water	Water and Land	Water and land	Water, land and air	Land or water
2.	Respiratory organs	Gills	Gills, lungs	Lungs	Lungs	Lungs
3.	Heart	2-cham-bered	3-cham-bered	3-cham-bered	4-cham-bered	4-cham-bered
4.	Maintenance of body temperature	Cold blooded	Cold blooded	Cold blooded	Warm blooded	Warm blooded

5.	Young ones	Eggs	Eggs in water	Eggs with tough coating, on land	Eggs	Young babies except Platypus and echidna.
6.	Skin	Skin covered with scales	Mucus glands in skin	Skins covered with scales	Skin covered with feathers	Hair, oil and sweat glands are present on the skin
7.	Special features	Streamlined body	Need water for completion of life cycle		Hollow Bones	Mammary glands which produces milk for children
8.	*Example :*	Anabas, Dog fish, Angler fish, Mandarin fish, Electric ray, Sting fish, Sea horse, Flying fish	Salamander, Common frog, Toad, Hyla (tree frog)	Trutle, Snakes, Lizard Flying lizard, Crocodile, Chameleon	Ostrich, Sparrow, Crow, Pigeon, Tufted Duck, White Stock	Humans, Lion, Tiger, Cat, Bat, Whale

Salient Features of Different Phyla of the Animal Kingdom

Phylum	Level of Organisation	Symmetry	Coelom	Segmentation	Digestive System	Circulatory System	Respiratory System	Distinctive Features
Portifera	Cellular	Various	Absent	Absent	Absent	Absent	Absent	Body with Pores and canals in walls.
Coelenterata (Cnidaria)	Tissue	Radial	Absent	Absent	Incomplete	Absent	Absent	Cnidoblasts present.
Ctenophora	Tissue	Radial	Absent	Absent	Incomplete	Absent	Absent	Comb plates for locomotion.
Platyhelminthes	Organ & Organ-System	Bilateral	Absent	Absent	Incomplete	Absent	Absent	Flat body, suckers.
Aschelminthes	Organ-System	Bilateral	Pseudo coelomate	Absent	Complete	Absent	Absent	Often worm-shaped, elongated.
Annelida	Organ-System	Bilateral	coelomate	Present	Complete	Present	Absent	Body segmentation like rings.
Arthropoda	Organ-System	Bilateral	coelomate	Present	Complete	Present	Present	Exoskeleton of cuticle,jointed appendages.

Mollusca	Organ-system	Bilateral	Coelo-mate	Absent	Complete	Present	Present	External skeleton of shell usually present.
Echino-dermata	Organ-system	Radial	Coelo-mate	Absent	Complete	Present	Present	Water vascular system. radial symmetry.
Hemi-chordata	Organ-system	Bilateral	Coelo-mate	Absent	Complete	Present	Present	Worm-like with proboscis, collar and trunk.
Chordata	Organ-system	Bilateral	Coelo-mate	Present	Complete	Present	Present	Notochord, dorsal hollow nerve cord, gill slits with limbs or fins.

QUESTIONS

VERY SHORT ANSWER TYPE QUESTIONS

1. Define biodiversity.
2. Who wrote the book 'Origin of Species'.
3. What do you mean by primitive organism and advanced organism ?
4. Who is 'known as the father of taxonomy?
5. List out the range of variations that you see around you among living organisms.
6. In Five kingdom classification, write the correct sequence of five kingdom classificatoin.
7. Write the examples of Archaebacteria and Eubacteria.
8. What are resting spore and heterocyst ?
9. Who is the father of Evolution?
10. Give two examples belonging to members of Nematoda.

SHORT ANSWER TYPE QUESTION

1. What are the most striking features of phylum Arthropoda? Explain with example.
2. List the differences between Annelids and Arthropods.
3. Give two examples from phylum Protochordata. Why they are placed in this phylum.
4. Bats and Whales are classified as mammals. Why ?
5. What do you understand by Nomenclature. What conventions are followed during nomenclature of an organism. Write the biological name of Human, Housefly and Cockroach.

LONG ANSWER TYPE QUESTION

1. Define : (a) Evolution (b) Species (c) Viviparous
   (d) Oviparous (e) Coelom (f) Bilateral Symmetry.
2. Who proposed Hierarchical Classification. Give a brief account of Texans used in Hierarchical classificatoin.
3. Who proposed five Kingdom classification. Explain 5 kingdom classification in detail ?
4. Differentiate Between -
   (a) Angiosperms and Gymnosperms
   (b) Monocot and Dicots
   (c) Prokaryotes adn Eukaryotes.

OBJECTIVE TYPE QUESTIONS

MCQ

1. Chloroplast in Spirogyra is :

(a) spirally arranged and ribbon shaped with pyrenoids
(b) spirally arranged without pyrenoids
(c) circular
(d) cup-shaped

2. Needle shaped structure in Pinus plant is :

(a) leaf (b) root
(c) stem (d) reproductive part

3. Which among the following produce seeds ?

(a) Thallophyta (b) Bryophyta
(c) Pteridophyta (d) Gymnosperms

4. Which of the follwing are called "Amphibians of Plant Kingdom" ?

(a) bryophytes (b) algae
(c) pteridophytes (d) gymnosperms

5. A plant has woody stem and its leaves show reticulate venation ?

(a) gymnosperm (b) monocot
(c) dicot (d) pteridophyte

6. Some students want to prepare a temporary mount of Spirogyra. Where should they serarch for fresh specimen ?

(a) In a pond and salty water (b) in a stream of fresh water
(c) in a stream of salty water (d) in a pond with stagnant water

7. Pneumatic bones is an importat characteristic of :

(a) repitiles (b) amphibians
(c) aves (d) mammals

8. Earthworm is :

(a) bisexual with self fertilization (b) bisexual with cross-fertilizatoin
(c) unisexual with cross-fertilixatoin (d) none of these

9. Which one is a true fish ?

(a) Jellyfish (b) Starfish
(c) Dogfish (d) Silverfish

10. Which of the following is not an aerial adaptation of a bird ?

(a) Presence of strong flight muscles (b) Presence of vertebral columns
(c) Streamlined body (d) Forelimbs modified into wings

1. Assertion (A) : Bryophytes are called amphibians of plant kingdoms
   Reason (R) : In bryophytes water is required for fertilization.
2. Assertion (A) : Organisms named according to Binomial Nomenclature.
   Reason (R) : Names consist of two words one scientific and other vernacular.
3. Assertion (A) : Platyhelminthes are commonly called flatworms
   Reason (R) : Platyhelminthes are elongated, dorsoventrally flattened animals.
4. Assertion (A) : Lichens are examples of bryophyta.
   Reason (R) : Lichen is a symbotic relation between a Fungi and Algae.
5. Assertion (A) : Vascular and mechanical tissue is absent in thallophyta
   Reason (R) : Thallophyta are usually aquatic organisms.