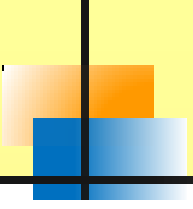
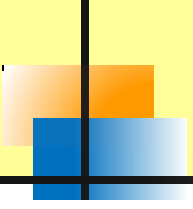
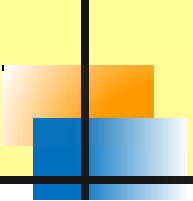


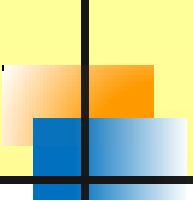
ANIMAL KINGDOM

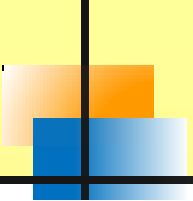


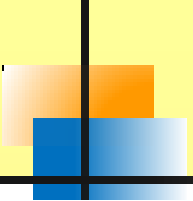
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- **Animal Kingdom includes only multicellular eukaryotes.**
 - **Whales and Giant Squids are macroscopic and multicellular animals.**
 - **The important groups represented by the Kingdom are protozoa, sponges, Coelenterates, worms, Annelids, Arthropods, Molluscs, Star Fishes, Fishes, Amphibians, Reptile, Birds and Mammals.**
 - **“Animals are a major group of mostly multicellular, eukaryotic organisms of the kingdom Animalia or Metazoa.”**
 - **Their body plan eventually becomes fixed as they develop, although some undergo a process of metamorphosis later on in their life.**
 - **Most animals are motile, meaning they can move spontaneously and independently.**

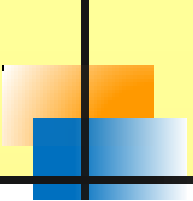
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- **All animals are also heterotrophs, meaning they must ingest other organisms for sustenance.**
 - **The Animal Kingdom is classified on the basis of following features-**
 - **Arrangement of cells.**
 - **Body Symmetry**
 - **Nature of Coelom**
 - **Pattern of Digestive System**
 - **Pattern of Circulatory System**
 - **Pattern of Reproductive System**
 - **All members of Animalia are multicellular, all of them do not exhibit the same pattern of organisation of cells. Example, in sponges, the cells are arranged as loose cell aggregates, i.e., they exhibit cellular level of organisation.**

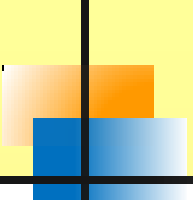
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- **In coelenterates the cells performing the same function are arranged into tissues, hence is called tissue level of organisation.**
 - **In Platyhelminthes tissues are grouped together to form organs, each specialised for a particular function, it is called Organ level of organisation.**
 - **In animals like Annelids, Arthropods, Molluscs, Echinoderms and Chordates, organs have associated to form functional systems, each system concerned with a specific physiological function. This pattern is called organ system level of organisation.**
 - **Organ systems in different groups of animals exhibit various patterns of complexities.**

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- **For example, the digestive system in Platyhelminthes has only a single opening to the outside of the body that serves as both mouth and anus, and is hence called incomplete.**
 - **A complete digestive system has two openings, mouth and anus.**
 - **The circulatory system may be of two types-**
 - **open type in which the blood is pumped out of the heart and the cells and tissues are directly bathed in it.**
 - **closed type in which the blood is circulated through a series of vessels of varying diameters (arteries, veins and capillaries).**
 - **All members of Animalia are multicellular, all of them do not exhibit the same pattern of organisation of cells. Example, in sponges, the cells are arranged as loose cell aggregates, i.e., they exhibit cellular level of organisation.**

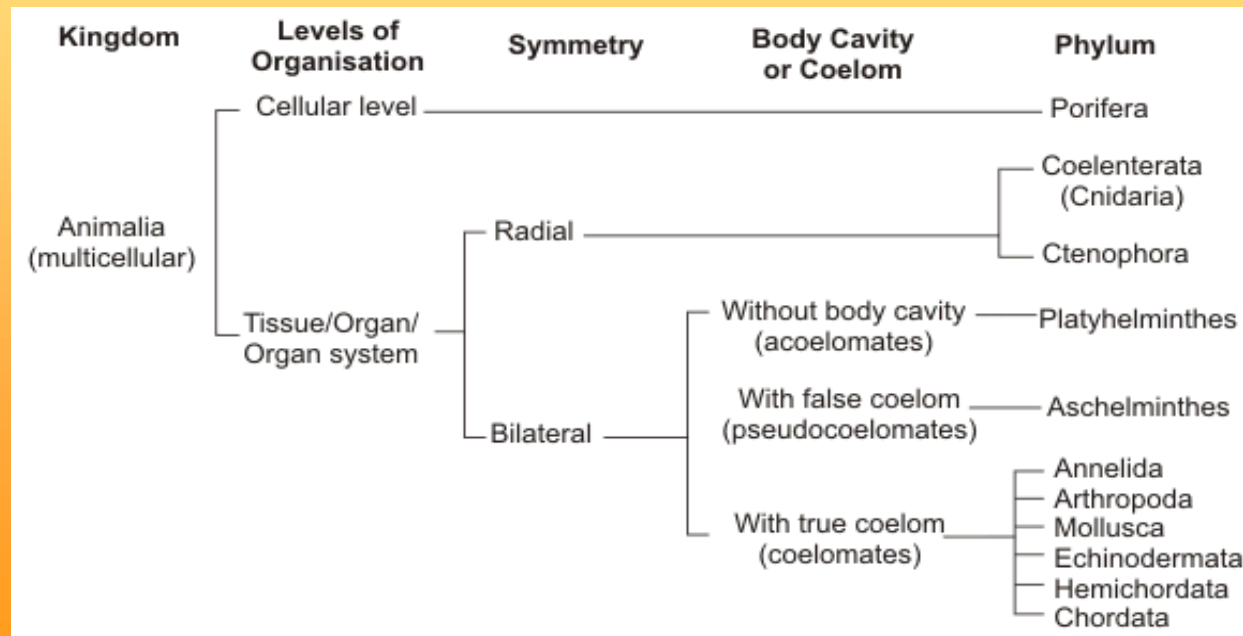
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- **In coelenterates the cells performing the same function are arranged into tissues, hence is called tissue level of organisation.**
 - **In Platyhelminthes tissues are grouped together to form organs, each specialised for a particular function, it is called Organ level of organisation.**
 - **Animals are categorised on the basis of their symmetry.**
 - **Sponges are mostly asymmetrical, i.e., any plane that passes through the centre does not divide them into equal halves.**
 - **When any plane passing through the central axis of the body divides the organism into two identical halves, it is called 'radial symmetry'. Coelenterates, ctenophores and echinoderms have this kind of body plan.**

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- **Animals like annelids, arthropods, etc., where the body can be divided into identical left and right halves in only one plane, exhibit bilateral Symmetry.**
 - **Animals in which the cells are arranged in two embryonic layers, an external ectoderm and an internal endoderm, are called 'diploblastic' animals. Example Coelenterates.**
 - **An undifferentiated layer, mesoglea, is present in between the ectoderm and the endoderm.**
 - **Those animals in which the developing embryo has a third germinal layer, mesoderm, in between the ectoderm and endoderm, are called 'triploblastic' animals .**
 - **Examples- platyhelminthes to chordates.**

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- **In classification presence or absence of a cavity between the body wall and the gut wall is very important . The body cavity, which is lined by mesoderm is called 'coelom'.**
 - **Animals possessing coelom are called 'coelomates'. Example-annelids, molluscs, arthropods, echinoderms, hemichordates and chordates.**
 - **In some animals, the body cavity is not lined by mesoderm, instead, the mesoderm is present as scattered pouches in between the ectoderm and endoderm . Such a body cavity is called 'pseudocoelom' and the animals possessing them are called 'pseudocoelomates'. Example -Aschelminthes.**
 - **The animals in which the body cavity is absent are called 'acoelomates'. Example –platyhelminthes.**

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- **In some animals, the body is externally and internally divided into segments with a serial repetition of at least some organs.**
 - **Example, in earthworm, the body shows this pattern called metameric segmentation and the phenomenon is known as metamerism.**
 - **Notochord is a mesodermally derived rod-like structure formed on the dorsal side during embryonic development in some animals.**
 - **Animals with notochord are called chordates. Examples- Urochordata, Cephalochordata and Vertebrata.**
 - **Animals which do not form notochord are called non-chordate. Example- Porifera to echinoderms.**
 - **They obtain food from outside source. They swallow their food and they digest food inside the body.**

- **The Animal Kingdom is divided into two major Divisions-**
 - **Invertebrates-** Animals that do not have backbone.
 - **Vertebrates –** Animals which have backbone.
- **The Animal Kingdom is broadly classified based on common fundamental features as-**

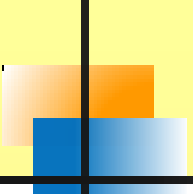


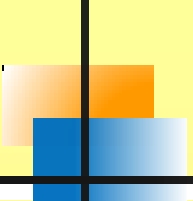


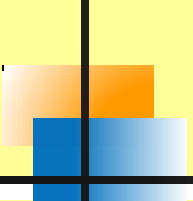
- **The Animal Kingdom is divided into 9 Phylum-**

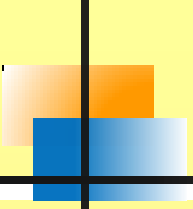
- **Porifera**
- **Coelenterata**
- **Platyhelminthes**
- **Aschelminthes**
- **Annelida**
- **Mollusca**
- **Echinodermata**
- **Arthropoda**
- **Chordata**

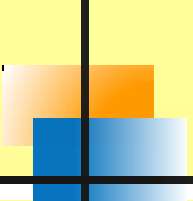
- **Invertebrates are animals that do not have backbones.**
- **97% of the animal kingdom is made up of invertebrates.**
- **Some can be found in ponds, oceans and other water environments.**
- **Insects and some other invertebrates have exoskeletons.**

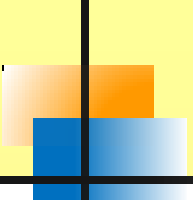
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- **An Exoskeleton is a hard outer covering that protects an animal's body and gives it support.**
 - **There are six groups of invertebrates.**
 - **They are-**
 - **Porifera (Sponges)**
 - **Coelenterata (Cnidaria)**
 - **Ctenophora (Sea Walnuts)**
 - **Platyhelminthes (Flatworms)**
 - **Aschelminthes (Roundworms)**
 - **Annelida (Segmented worms)**
 - **Porifera means having 'pores'. Members of this phylum are commonly known as sponges. They are mostly asymmetrical animals and generally marine.**
 - **They look plant like. They are fixed at one place.**
 - **These are primitive multicellular animals and have cellular level of organisation.**

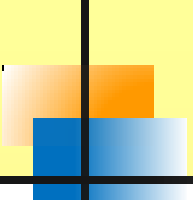
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- **Sponges have a water transport or canal system. Water enters through minute pores (ostia) in the body wall into a central cavity, spongocoel, from where it goes out through the osculum.**
 - **This pathway of water transport is helpful in food gathering, respiratory exchange and removal of waste.**
 - **Choanocytes or collar cells line the spongocoel and the canals. Digestion is intracellular.**
 - **The body is supported by a skeleton made up of spicules or spongin fibres.**
 - **Sexes are hermaphrodite i.e., eggs and sperms are produced by the same individual. Sponges reproduce asexually by fragmentation and sexually by formation of gametes.**

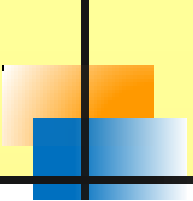
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- **Fertilisation is internal and development is indirect having a larval stage which is morphologically distinct from the adult.**
 - **They are aquatic, mostly marine, sessile or free-swimming, radially symmetrical, sac-like animals.**
 - **The name cnidaria is derived from the cnidoblasts or cnidocytes. These cnidoblasts have the stinging capsules or nematocytes present on the tentacles and the body.**
 - **Cnidoblasts are used for anchorage, defense and for the capture of prey.**
 - **Cnidarians exhibit tissue level of organisation and are diploblastic.**
 - **They have a central gastro-vascular cavity with a single opening, hypostome.**

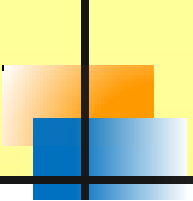
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- **Some Coelenterates like corals have a skeleton composed of calcium carbonate.**
 - **Cnidarians exhibit two basic body forms called polyp and medusa. The former is a sessile and cylindrical form like *Hydra*, *Adamsia*, etc. whereas, the latter is umbrella-shaped and free-swimming like *Aurelia* or jelly fish.**
 - **Those cnidarians which exist in both forms exhibit alternation of generation (Metagenesis), i.e., polyps produce medusae asexually and medusae form the polyps sexually (e.g., *Obelia*).**
 - **Examples: *Physalia* (Portuguese man-of-war), *Adamsia* (Sea anemone), *Pennatula* (Sea-pen), *Gorgonia* (Sea-fan) and *Meandrina* (Brain coral).**

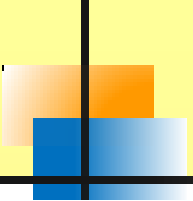
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- **Ctenophores, commonly known as 'sea walnuts' or 'comb jellies' are exclusively marine, radially symmetrical, diploblastic organisms with tissue level of organisation.**
 - **The body bears eight external rows of ciliated comb plates, which help in locomotion.**
 - **Digestion is both extracellular and intracellular.**
 - **Bioluminescence ; the property of a living organism to emit light is well-marked in ctenophores.**
 - **Sexes are not separate. Reproduction takes place only by sexual means. Fertilisation is external with indirect development.**
 - **Examples: *Pleurobrachia* and *Ctenoplana*.**

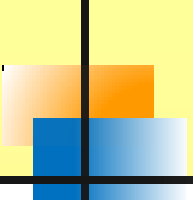
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- **The basic fundamental features such as level of organisation, symmetry, cell organisation, coelom, segmentation, notochord, etc., have enabled us to broadly classify the animal kingdom.**
 - **There are many other distinctive characters which are specific for each phyla or class.**
 - **Animals /organisms floating on the surface of water are known as plankton.**
 - **A gregarious but nonsocial animal is Locust.**
 - **An animal devoid of anus is *Fasciola*.**
 - **Besides Annelida and Arthropoda metamerism is found in Chordata.**
 - **On the basis of organisation, animals are grouped into Protozoa and Metazoa.**

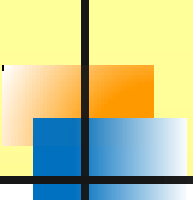
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- **Animals having well marked digestive cavity are included under Enterozoa.**
 - **Haemocoel is present in *Scolopendra*.**
 - **A true coelom is absent in phylum Platyhelminthes and Nematoda.**
 - **A true coelom or body cavity occurs in *Pheretima*.**
 - **An animal having diploblastic acoelomic condition is Sea Anemone.**
 - **True coelom appeared first in the course of evolution in Annelida. True coelom is covered by mesoderm.**
 - **The term for body cavity present in triploblastic animals is coelom.**
 - **Coelom derived from blastocoel is known as Pseudocoelom. Animal group with pseudocoelom is Aschelminthes. Example – *Wuchereria* / Hookworm.**

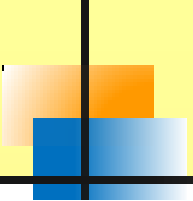
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- **Coelom is cavity between Ectoderm and Endoderm (alimentary canal) and body wall enclosed by Mesoderm on both sides.**
 - **Coelom produced by splitting of mesoderm is Schizocoel.**
 - **Haemocoel occurs in Arthropoda.**
 - **An enterocoelomate invertebrate group is Echinodermata.**
 - **Coelomate animal where blastopore develops into anus is Deuterostomate.**
 - **An animal without segmentation is Shipworm.**
 - **Body does not show any segmentation in Star fish/Hydra.**
 - **Radial symmetry occurs in Coelenterata and Echinodermata.**

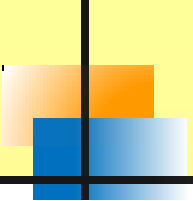
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- **Radial symmetry occurs in Star fishes and Sea Anemone.**
 - **A radially symmetrical diploblastic animal is *Hydra*.**
 - **Radial symmetry is often exhibited by animals having Benthos/Sedentary nature.**
 - **Metamerism is characteristic of Annelida.**
 - **There are many other distinctive characters which are specific for each phyla or class.**
 - **Porifera includes multicellular animals which exhibit cellular level of organisation and have characteristic flagellated Choanocytes.**
 - **Sponges are Diploblastic and devoid of respiratory, excretory ,circulatory organs and nerve cells.**
 - **Canal system is found in Sponges.**

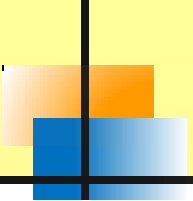
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- **Path of water in a sponge is – Dermal Ostia → Gastral Ostia → Spongocoel → Osculum.**
 - **A common chamber for all the canals of a sponge is 'Paragastric cavity'.**
 - **The simplest type of canal system in Porifera is 'Ascon Type'.**
 - **In Sponges canal system develops due to Folding of inner walls.**
 - **The middle layer in body wall of Porifera is called Mesoglea.**
 - **Sponge structure corresponding to mouth of other animal is 'Ostium'.**
 - **'In sponges there is a single exit and a number of mouths. All sponges have spongocoel.**
 - **The epithelial lining of Sycon is made of flat cells/ Pinacocytes.**

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- **In digestion takes place in food vacuoles.**
 - **Internal asexual propagule of some fresh water sponges is 'Gemmule'.**
 - **Reproductive cells of sponges are formed from Archaeocytes.**
 - **Classification of Porifera is based on spicules.**
 - **Thesocytes serve as food reserve in sponges.**
 - **Incurrent canals are lined by Porocytes.**
 - **Parenchymula is the larva of *Leucosolenia*.**
 - **Skeleton made of spongin fibres occurs in Demospongiae.**
 - **Glass rope sponge belongs to Hyalospongiae.**
 - **Amphiblastula is the larva in *Sycon* .**
 - **'Venus Flower Basket' is given as Precious marriage gift in Japan is *Euplectella*.**

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- The skeleton of bath sponge, *Euspongia* is made of spongin fibres, it is found in Mediterranean sea.
 - *Cliona* is harmful sponge for Oyster industry.
 - The Coelenterates have tentacles and bear cnidoblasts.
 - They are mostly aquatic, sessile or free- floating.
 - Hydra is diploblastic, radially symmetrical and acoelomatic. *Hydra* is a polyp.
 - Body cavity of *Hydra* is also known as 'Enterocoel' or 'Coelenteron'.
 - In *Hydra*, both pseudopodia and flagella occur in nutritive cells.
 - Nematocyst of *Hydra* are penetrant, solvent and glutinant.

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- The gastro-vascular cavity of *Hydra* provides for digestion and circulation.
 - In ectoderm of *Hydra*, bulk of cells are musculo-epithelial.
 - In *Hydra*, cnidoblasts employed during looping are desmonemes.
 - Gastrodermis of *Hydra* takes part in digestion of proteins, fats and some carbohydrates.
 - Mesogloea of *Hydra* is made of Mucopolysaccharides.
 - *Hydra* has nerve cells but no nerves.
 - Nematocyst take part in locomotion, offence and defence and capturing of food. They are activated by touch. Poisonous fluid present in Nematocyst is 'Hypnotoxin'.

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- In nematocyst in *Hydra* ejection occurs in response to contact and pierces the prey.
 - Testes are located at distal half in *Hydra*.
 - Zoochlorellae and zooxanthallae present in *Hydra* are symbionts in nutritive cells.
 - Some Crustacean are food of *Hydra*.
 - *Hydra* reproduces sexually and asexually.
 - Budding is the normal mode of asexual reproduction in *Hydra*.
 - *Hydra* will regenerate from a fragment, if it contains epidermis and Gastrodermis.
 - A mature hydra usually bears several testes and several ovaries. Testes are formed in *Hydra* from 'Interstitial cells'. There is only one ovum in the ovary of *Hydra*.

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- In *Sea Anemone* , the symmetry is radial.
 - Portuguese-man-of-war is *Physalia* which is a polymorphic coelenterate.
 - Jelly fish belongs to class Scyphozoa.
 - Precious Red coral is used in ornaments is *Corallium*.
 - Organ pipe coral is *Tubipora*.
 - Gonads of *Obelia* occur on radial canals , oral surface of medium and four in number.
 - Most appropriate term for the life cycle of *Obelia* is Metagenesis. Medusa of *Obelia* is carnivorous.
 - Statocysts are sense organs of Medusa of *Obelia*.
 - Nematocyst occur in *Obelia*.



Thanks...