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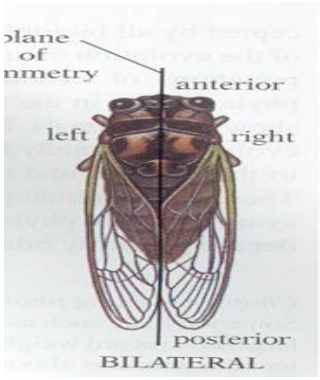
Assignment 11 - Biodiversity of Animals

1. Compare the similarities of animals by listing characteristics that all animals have in common.

Animal Characteristics
• All animals are multicellular. • **Animals are heterotrophs** • **Animals require oxygen** • **Animals reproduce sexually sometime asexually** • **Animals are motile during some part of life** • **Animals go through embryonic development**

2. Contrast the body structure of animals by illustrating and explaining the difference between radial symmetry and bilateral symmetry.

Body Structure	
Radial Symmetry	**Bilateral Symmetry**
Illustrate an organism with radial symmetry.  **radial symmetry of the purple sea urchin**	Illustrate an organism with bilateral symmetry. 
Explain how animals with radial symmetry are different from those with bilateral symmetry. **Animals with radial symmetry generate identical body halves around the central axis; their body cannot be divided into left and right sides; similar body parts are arranged in a regular manner around the central axis; the development of the head in front of the body is rare; sea urchins, sea anemone, jellyfish are some examples of organisms with radial symmetry while animals with bilateral symmetry generate only two sides as left and right along the sagittal plane; the sagittal plane divide the body into**	

left and the right sides; similar body parts are arranged in both left and right sides equally; the development of a head in front of the organism's body is a prominent feature; humans, insects, orchids are example of organisms with bilateral symmetry.

3. Complete the tables below to analyze how animals are categorized into various groups, by comparing and contrasting their similarities and differences.

Kingdom Animalia	
Phylum Porifera	
Characteristics	**Illustration**
Lacks planes of body symmetry Does not have true tissues, organs, or organ systems Water-dwelling **Their body is usually cylindrical.** **The scleroblast secretes spicules while spongin fibres are secreted by spongioblasts.** **They have no organs in their body.** **They depict cellular grade of organization.** **The body comprises numerous pores known as Ostia and osculum.** **The central cavity is called spongocoel or atrium which opens to the outside through the osculum.**	Sponge **Sponges are found in shallow water and deep seas, but are always found attached to the floor of the sea. They can be found at a depth of more than 8000 metres.**

They reproduce asexually by budding, and fragmentation. **The nutrition is holozoic.** **They have neurosensory cells but are devoid of any specific nervous system.** **They have the power to regenerate the lost parts.** **The development is indirect and the cleavage is holoblastic.** **The exchange of respiratory gases and nitrogenous wastes occurs by the process of diffusion**.	

Kingdom Animalia	
Phylum Cnidaria	
Characteristics	**Illustration**
Radial symmetry Many species have nematocysts (stinging cells) Water-dwelling Single body cavity for digestion Many species have polyp stage and medusa stage Has a gastrovascular cavity **Live in colonies (corals) as well as solitary (Sea anemone).**	Sea anemone **They are found exclusively in the marine environment.** **Mesogloea contains fibrous connective tissues and amoeboid cells.** **Medusa is not present.** Coral **They are found exclusively in the marine environment.** **Mesogloea contains fibrous connective tissues and amoeboid cells.** **Medusa is not present.** Jellyfish **They are found exclusively in the marine environment.** **Medusa is dominant and umbrella-shaped.** **Polyps are not present.** **Mesogloea is cellular.** Hydra **These are mostly marine species, found exclusively in freshwater.**

	Few are found in colonies and few are found solitarily. **Asexual Polyps is the dominant form.** **Mesogloea is acellular.**

Kingdom Animalia	
Phylum Platyhelminthes (Flatworms)	
Characteristics	**Illustration**
Bilateral symmetry Gastrovascular cavity Flat body structure Lacks respiratory and circulatory organs **Dorsoventrally flattened body.** **Complex and have differentiated body structure.** **Tissues are differentiated from three layers of cells and are triploblastic.** **Do not have a true internal cavity or coelom.** **Have bilateral symmetry.** **Either free-living (Planaria) or parasitic (liver flukes).**	Planarian **These are free-living organisms found mostly in fresh water.** **The body is dorsoventrally flattened.** **Hooks and suckers are not present** Liver fluke **These are mostly parasitic** **Hooks and suckers are usually present**. Tapeworm **These are exclusively parasitic.** **They have hooks and suckers**. Turbellarian (marine flatworm) **These are free-living organisms found mostly in fresh water.**

	The body is dorsoventrally flattened. **Hooks and suckers are not present**

Kingdom Animalia	
Phylum Annelida (Segmented Worms)	
List of Characteristics	**Illustration**
Bilateral symmetry Segmented Complete digestive system with separate mouth and anus **Closed circulatory system** **Have a segmented cylindrical body.** **The body is differentiated into head and tail.** **Bilaterally symmetrical and triploblastic.** **Have a true body cavity.** **Habitat: marine, freshwater and land**.	Earthworm **They are mostly freshwater and terrestrial organisms.** **The body is segmented metamerically.** **Head, eyes and tentacles are not distinct.** **They are hermaphrodites, but cross-fertilization takes place.** **Fertilization is external.** **Cocoon formation occurs.** **Setae are segmented.** **They do not possess parapodia but clitellum is present.** **The organisms belonging to this class are monoecious** **They exhibit no free larval stage and the development takes place inside the cocoons**

	Leech **Most commonly found in freshwater. Some are marine, terrestrial, and parasitic.** **The body is segmented.** **The tentacles, parapodia, and setae are not present.** **The animals are monoecious.** **The body is dorsoventrally or cylindrically flattened.** **They have an anterior and posterior sucker on the ventral side.** **The organisms lay eggs in cocoons.** **There is no larval stage during the development of the organism.** **The mouth is located ventrally in the anterior sucker, while the anus is present dorsally in the posterior sucker.** **Fertilization is internal.** **They are hermaphrodites** Polychaetes **The body is elongated and divided into segments.** **They are found in the marine environment** **These are true coelomates, bilaterally symmetrical worms.** **They excrete through metanephridia and protonephridia.**

	Fertilization is external. **They have a well-developed nervous system.** **The circulatory system is closed type.** **They are hermaphrodites.** **They might possess fin-like appendages called parapodia.** **The organisms belonging to this group lack clitellum and are dioecious.**

Kingdom Animalia	
Phylum Nematoda (Roundworms)	
Characteristics	**Illustration**
Cylindrical body Not segmented Outer cuticle **Nematodes have a cylindrical body.** **Bilaterally symmetrical and triploblastic.** **Have pseudocoelom, a false body cavity.** **Parasitic and causes diseases such as elephantiasis, ascariasis.**	Soil Nematode **These are mostly parasitic.** **Caudal glands are absent.** **Unicellular, pouch-like sense organs called plasmids are present.** **The excretory system has paired lateral canals.** Ascaria lumbricoides **These are oviparous, large stout nematodes living as parasites in the intestine of the vertebrates.**

	The pharynx may or may not contain a posterior bulb. **Mouth possess 3 prominent lips** **There is no buccal capsule.**

Kindom Animalia		
Phylum Mollusca		
Characteristics	**Class**	**Illustration**
Bilateral symmetry Soft-bodied, many have shells for protection Body typically has: 1. Muscular foot 2. Visceral mass 3. Mantle Many species feed using a radula to scrape food from hard surfaces **Bilaterally symmetrical and triploblastic.** **Less segmented body.** **Well-developed organ and organ system.**	Class Polyplacophora	Chiton **Their body is dorsoventrally flattened like a leaf, and are bilaterally symmetrical.** **The shell is composed of 8 longitudinal plates.** **They have a well-developed radula.** **The ventral foot is flat.**
	Class Monoplacophora	*Neopilina* **The body is bilaterally symmetrical.**

Typically, open circulatory system. **Limbs are present.**		**The head is devoid of eyes and tentacles.** **Respiration occurs through gills which are externally located.** **The nitrogenous waste is excreted out through nephridia.**
	Class Gastropoda	Snail **They are found either on land or in fresh and marine water.** **The head bears tentacles, eyes, and a mouth.** **The shell is spiral in shape.** **The foot is flat and large.**
	Clas Bivalvia	Clam **They reside in aquatic habitats.** **The body is bilaterally symmetrical and compressed laterally.** **The body has no distinct head.**

		They usually burrow in mud and sand.
	Class Cephalopoda	Octopus **They are mostly found in the marine environment.** **The shell is either external, internal, or not present at all.** **They have separate sexes.** **The development is direct.**
	Class Scaphopoda	Tusk shell **Found in the marine environment.** **The eyes and tentacles are absent.** **The foot is reduced.** **The body is bilaterally symmetrical.**

Kingdom Animalia			
Phylum Arthropoda			
General Characteristics	**Subphylum**	**Specific Characteristics**	**Illustration**
Bilateral symmetry Segmented body Exoskeleton comprised of chitin Jointed appendages **They are bilaterally symmetrical.** **Have jointed appendages, exoskeleton and a segmented body.** **Have well-differentiated organ and organ system.** **Have an open circulatory system, but do not have differentiated blood vessels.**	Subphylum Chelicerata	Have mouth appendages called chelicerae **They are mostly found on land.** **The body is differentiated into cephalothorax and abdomen.** **Antennae are absent.** **The abdomen is divided into 13 segments.** **It has four pairs of interior appendages.** **They respire through trachea or gills.** **The Malpighian tubules help in excretion.**	Arachnids (spiders) Horseshoe crab Scorpion
	Subphylum Myriapoda	Many body segment Body segments have one or two pairs of legs **These are mostly terrestrial.** **The body is elongated with numerous segments.**	Millipede Centipede

		The head is provided with antennae, two pairs of jaws, and a pair of simple eyes. **They contain numerous legs.** **The upper lip of the mouth contains epistome and labrum, and the lower lip contains a pair of maxillae.** **A pair of mandibles is present inside the mouth.** **They respire by trachea and excretion occurs by Malpighian tubules**.	
	Subphylum Crustacea	Aquatic, except woodlice Biramous appendates (split into two), with segments attached end-to-end **They are aquatic, terrestrial, or parasitic.** **The head is fused with the thorax region known as the cephalothorax.**	Lobster Crab

		Respiration occurs through gills or general body surface. **The body is covered by a single large carapace.** **They possess two pairs of antennae and five pairs of appendages.** **They excrete through green glands or antennal glands.** **They have a pair of compound eyes and gonopores.** **Development is indirect. Larval stage is present.**	
			Barnacle Shrimp
	Subphylum Hexapoda	All insects Body has head, thorax, and abdomen	Honey bee

		Six legs attached to the thorax Two antennae **They are mostly terrestrial.** **The body is differentiated into head, thorax, and abdomen.** **Head bears a pre-segmental acron.** **The thorax is divided into three segments.** **The abdomen has 7-11 segments.** **They have three pair of appendages.** **It has a pair of compound eyes** **They respire through gills and trachea.** **Malpighian tubules are the excretory organ.** **Development is indirect, and the larval stage is present.**	Mosquito

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Kingdom Animalia			
Phylum Echinodermata			
General Characteristics	**Subphylum**	**Specific Characteristics**	**Illustration**
Ocean-dwelling Endoskeleton comprised of calcium carbonate **Radial symmetry and triploblastic.** **Have true coelom.** **Have hard calcium carbonate skeleton structure.** **Free-living marine animals.**	Asterozoa	Star-shaped body Larvae have bilateral symmetry Adults have fivefold symmetry Tube feet	Sea star Brittle star **They have a flattened, star-shaped body with five arms.** **They have tube feet with suckers.** **They respire through papulae.** **The body comprises of calcareous plates and movable spines.** **Pedicellaria is present.**

	Crinozoa	Mostly sessile, but may be freeswimming as adult Five-fold symmetry recognizable, but may have many more arms	Sea lily **The body is star-shaped.** **The tube feet have no suckers.** **The arms are bifurcated.** **Spines and pedicellariae are absent.**
	Echinozoa	Globe-shaped body Spiny appendages Five-fold symmetry Tube feet	Sea urchin Sea cucumber **The body is hemispherical.** **The tube feet contains suckers.** **The body does not have arms.** **The body has a compact skeleton and movable spines**.