

Animal Kingdom — Assignment 2

Class 11 Biology · Higher-difficulty challenge set + integrated problems · Answer key included · Narayan Gurukul Academy

Instructions: (1) Attempt all questions; start with the topic-wise challenge set, then attempt the integrated (multi-topic) problems.
(2) Give all answers with correct SI units. $g = 10 \text{ m/s}^2$ unless stated.
(3) A final answer key is provided at the end — try the full set before checking it.

Part A — Topic-wise challenge questions

Basis of Classification

1. Distinguish between diploblastic and triploblastic animals.
2. Distinguish between acoelomate and pseudocoelomate animals.
3. Explain the different types of body symmetry with examples.

Phylum Porifera and Coelenterata (Cnidaria)

1. How does a sponge obtain food?
2. What is metagenesis in cnidarians?
3. Describe the characteristic features of Coelenterata.

Phylum Ctenophora, Platyhelminthes and Aschelminthes

1. State two features of Platyhelminthes.
2. State two features of Aschelminthes.
3. Describe the characteristic features of Platyhelminthes with examples.

Phylum Annelida and Arthropoda

1. State two features of Annelida.
2. State two features of Arthropoda.
3. Describe the characteristic features of Arthropoda with examples.

Phylum Mollusca and Echinodermata

1. State two features of Mollusca.
2. State two features of Echinodermata.
3. Describe the characteristic features of Echinodermata with examples.

Phylum Hemichordata and Chordata

1. State the four fundamental features of chordates.
2. Distinguish between protochordates and vertebrates.
3. Describe the fundamental features of Chordata and its subdivisions.

Part B — Integrated problems (multi-topic)

1. Classify animals on the basis of coelom, symmetry and germ layers, giving an example of each category.
2. Compare Porifera and Coelenterata with respect to body organisation, digestion and special cells.
3. Distinguish between Platyhelminthes and Aschelminthes with respect to body form and coelom.
4. Explain why Arthropoda is the largest phylum, stating four of its characteristic features.
5. Describe the water-vascular system of echinoderms and its functions.
6. State the four fundamental characters of chordates and name the three subphyla.

Answer Key

Basis of Classification

Diploblastic animals have two germ layers (ectoderm, endoderm) and are radial (e.g. cnidarians); triploblastic animals have three germ layers (ectoderm, mesoderm, endoderm) and are bilaterally symmetrical (e.g. flatworms, annelids). Acoelomates have no body cavity (Platyhelminthes); pseudocoelomates have a false coelom lined partly by mesoderm (Aschelminthes); coelomates have a true coelom (Annelida onwards). Symmetry: asymmetry (sponges), radial (cnidarians, echinoderms as adults) and bilateral (most higher animals).

Phylum Porifera and Coelenterata (Cnidaria)

A sponge is a filter feeder: water enters through ostia, food particles are trapped by choanocytes (collar cells) and water exits through the osculum. Metagenesis is the alternation of the asexual polyp and sexual medusa generations in cnidarians. Coelenterata: diploblastic, radially symmetrical, tissue-level organisation, a single gastrovascular cavity (coelenteron) with a mouth, stinging cells (cnidoblasts) for defence and capture of prey; e.g. Hydra, jellyfish, corals.

Phylum Ctenophora, Platyhelminthes and Aschelminthes

Platyhelminthes: dorsoventrally flattened, bilaterally symmetrical, acoelomate, flame cells for excretion, hermaphrodite; e.g. planaria, liver fluke, tapeworm. Aschelminthes: round, cylindrical, bilaterally symmetrical, pseudocoelomate, with a complete digestive tract; e.g. Ascaris, Wuchereria. Features of Platyhelminthes: flat body, acoelomate, flame cells, mostly parasitic with hooks and suckers.

Phylum Annelida and Arthropoda

Annelida: metamerically segmented, coelomate, with a closed circulatory system and nephridia; e.g. earthworm, leech, Nereis. Arthropoda: chitinous exoskeleton, jointed appendages, segmented body, open circulatory system; e.g. insects, crustaceans, arachnids. Arthropoda is the largest phylum — features: chitinous exoskeleton, jointed appendages, segmented body divided into head/thorax/abdomen, and compound eyes.

Phylum Mollusca and Echinodermata

Mollusca: soft-bodied, unsegmented, with a calcareous shell (often), a muscular foot, a visceral hump and a radula; e.g. snail, octopus, Pila. Echinodermata: spiny-skinned, radially symmetrical adults, bilaterally symmetrical larvae, coelomate, with a unique water-vascular system used for locomotion, feeding and respiration; e.g. starfish, sea urchin, sea cucumber.

Phylum Hemichordata and Chordata

Hemichordata: a small phylum with a body split into proboscis, collar and trunk, gill slits, a rudimentary notochord (stomochord); e.g. Balanoglossus. Chordata: notochord, dorsal hollow nerve cord, paired pharyngeal gill slits and a post-anal tail; subphyla Urochordata and Cephalochordata (protochordates) and Vertebrata (with a vertebral column).

Integrated problems

1: Coelom — acoelomate (Platyhelminthes), pseudocoelomate (Aschelminthes), coelomate (Annelida onwards); symmetry — asymmetric (sponges), radial (cnidarians), bilateral (most higher animals); germ layers — diploblastic (cnidarians) and triploblastic (others). 2: Porifera — canal system, intracellular digestion, choanocytes; Coelenterata — gastrovascular cavity, extracellular digestion, cnidoblasts. 3: Platyhelminthes — flat, acoelomate; Aschelminthes — round, pseudocoelomate. 4: Chitinous exoskeleton, jointed appendages, segmented body, compound eyes — largest phylum. 5: Water-vascular system — a network of canals and tube feet used for locomotion, food capture and respiration. 6: Notochord, dorsal hollow nerve cord, pharyngeal gill slits, post-anal tail; subphyla Urochordata, Cephalochordata, Vertebrata.