Kingdom Animalia

General Characteristics:

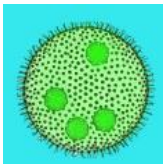
- Multicellular (consist of more than one cell)
- Eukaryotic cells
- Heterotrophic (need to eat)
- Most mobile (can move)

The following 9 phyla of the animal kingdom will be studied:

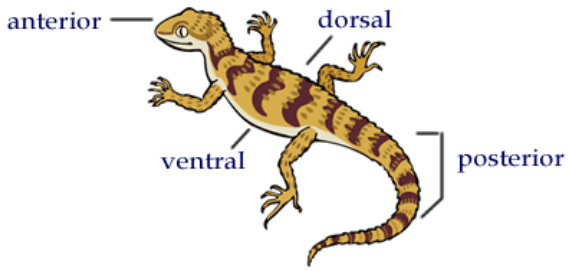
1. Phylum Porifera
2. Phylum Coelenterata
3. Phylum Platyhelminthes
4. Phylum Aschelminthes (Nematoda)
5. Phylum Annelida
6. Phylum Mollusca
7. Phylum Echinodermata
8. Phylum Arthropoda
   - Class Insecta
   - Class Crustacea
   - Class Arachnida
   - Class Chilopoda
   - Class Diplopoda
9. Phylum Chordata
   - Class Agnatha
   - Class Chonrichthyes
   - Class Osteichthyes
   - Class Amphibia
   - Class Reptila
   - Class Aves
   - Class Mammalia

Symmetry & Body Plan

Symmetry

A) SPHERICAL Body plan is a sphere.  Example: volvox	C) BILATERAL Body is made in two identical mirror images.  Example: human
B) RADIAL Body radiates out from one point and is on only one plane.  Example: starfish	D) ASYMMETRIC No definite body plan. The body shows random growth.  Example: tree

Body Plan



1. Phylum Porifera

- mostly marine
- **asymmetrical**
- the adults are always attached to a solid object
- the **body wall consists of two cell layers**
- the pores of the body wall are connected to an internal canal system
- **no tissues, organs, nervous system, or brain**
- **no circulatory system (no heart, blood or veins)**
- **no muscle** (**sessile** - do not move)
- **internal skeleton (endoskeleton) of spicules**
- example: sponges

2. Phylum Coelenterata (Cnidaria)

- mostly marine
- have **radial symmetry**
- have **tentacles with stinging cells** (1 tentacle can have 1000 **nematocysts**)
- the **body wall consists of two cell layers** (with jelly-like material between the layers)
- has **saclike digestive cavity with a single opening**
- have **true tissue (nerve, muscle, digestive)**
- have **nerve net but no brain**
- examples: jellyfish, coral, hydra, sea anemone

3. Phylum Platyhelminthes (flatworms)

- free living and parasitic forms
- have **bilateral symmetry** and are usually **flat**
- true organs – **digestive system but with only one opening**
- first life form to **have nerve tissue in head resembling brain**
- bodies consist of **3 cell layers**
- **no circulatory system**
- examples: tapeworms, planaria, liver flukes

4. Phylum Aschelminthes (Nematoda) (roundworms)

- are parasitic or free-living
- have **cylindrical bodies** and are **bilaterally symmetrical**
- has **no circulatory or respiratory system**
- have a **digestive tube with mouth and anus**
- lateral ventral nerves running along body
- examples: hookworm, ascaris, trichinella

5. Phylum Annelida (segmented worms)

- marine, freshwater, or terrestrial
- **bilaterally symmetrical**
- the body is **internally and externally segmented**
- **appendages are non-jointed or lacking**
- the nerve cord is in a ventral position
- first group to have **closed circulatory system** (blood flows in closed vessels)
- **hermaphrodites**
- **complete digestive system includes: mouth, muscular pharynx, esophagus, intestine, anus**
- examples: earthworm, leeches, polychaetes

6. Phylum Mollusca

- marine, freshwater, or terrestrial
- **bilaterally symmetrical or asymmetrical**
- **no segmentation**
- have **well-developed digestive, circulatory and nervous systems** (with large brain)
- has an **organ called a mantle** (fold of tissue over the body) which secretes a hard shell
- **muscular mantle for water flow & jet power for fast swimming**
- examples: octopus, squid, snails, clams, mussels, oysters, scallops, slugs

7. Phylum Echinodermata




- all are marine
- **adults are radially symmetrical**
- **larvae are bilaterally symmetrical**
- oral and radial nerve cord
- **has an internal limy skeleton**, usually with many projecting spines
- a system of **water-filled tubes**, acting on the suction principle, **catches food and assists in locomotion**
- examples: starfish, brittle stars, sea urchin, sea cucumber, sand dollar

8. Phylum Arthropoda

- marine, freshwater, or terrestrial
- **bilaterally symmetrical**
- has a **ventral, main nerve cord** which is solid
- **muscles are inside the skeleton**, it has an **exoskeleton**
- the **body is segmented, but the segments are often fused**
- has **jointed appendages**


A) Class Insecta
- has **one pair of antennae**
- the **body is divided into head, thorax, and abdomen**
- has **three pairs of legs on thorax**
- examples: butterfly, bee, grasshopper


B) Class Crustacea
- mainly marine
- has **two pairs of antennae**
- has **respiration by gills**
- **3 body parts with first two often fused** (cephalothorax)
- examples: crab, lobster, crayfish, shrimp, barnacles


C) Class Arachnida
- **two body parts** (cephalothorax and abdomen)
- has **four pairs of legs**
- **no antennae**
- **some** (orb weavers) **spin silk webs**
- has **no jaws** – the feeding appendages may resemble claw-bearing legs
- all spiders **have poisonous glands and fangs**, but only a few are harmful to humans
- examples: spider, scorpion, tick, mites

D) Class Chilopoda
- **carnivorous** (meat eaters)
- has **one pair of long antennae**
- the entire **body is segmented**, but flat
- there is **one pair of legs on each segment**
- has a **pair of poison glands behind head**
- example: centipede

E) Class Diplopoda

- feed on plants – **herbivorous**
- has **one pair of long antennae**
- there are **two pairs of legs on each segment**
- has **no poison glands**
- it curls into a ring when disturbed
- example: millipede

9. Phylum Chordata

- marine, freshwater, or terrestrial
- **bilaterally symmetrical**
- **hollow dorsal nerve tube (spinal cord) and a stiff notochord (a flexible rod) beneath spinal cord** (which may be lost or replaced during development)
- muscles cover skeleton (**endoskeleton**)
- **several pairs of pharyngeal slits** (through which water is taken in and passed out) **in the throat region** (these may be changed or lost during development)
- **some segmentation, especially in muscles and nerves**

A) Class Agnatha

- has **no jaws**
- has **no paired fins**
- has a **skeleton of cartilage**
- has a **two-chambered heart**
- examples: hagfish, lamprey

B) Class Chonrichthyes (cartilaginous fish)

- has a jaw and **skeleton made of cartilage**
- has five or more **pharyngeal slits externally visible**
- has a **ventral mouth and nostrils**
- has a **two chambered heart**
- **no swim bladder**
- **lateral line** (predatory adaptation for detecting vibrations)
- examples: shark, skate, rays

C) Class Osteichthyes (bony fish)

- has a jaw and a **skeleton of bone**
- the **pharyngeal slits are covered** and are not externally visible
- has a **two-chambered heart**
- have a **swim bladder**
- **lateral line** (predatory adaptation for detecting vibrations)
- examples: salmon, trout, cod, perch

D) Class Amphibia



- have a **three-chambered heart**
- **lack claws on their toes**
- **seldom have scales**
- the **eggs have no shells and must be laid in water**
- **most have lungs** (adult) – **may also breath through moist skin**
- are **cold-blooded**
- examples: frog, toad, salamander

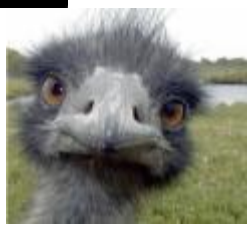
E) Class Reptila



- have **scales on skin**
- **breathe by lungs**
- are **cold blooded**
- have **three-chambered heart** (except crocs have 4)
- have **two pairs of appendages** (small and lacking in some) **with claws**
- **egg – leathery shell**
- examples: snake, lizard, turtle

F) Class Aves





- **feathers**
- they **lay eggs with a hard shell**
- they have **wings**
- have a **four-chambered heart**
- are **warm-blooded**
- examples: sparrow, chicken, ostrich

G) Class Mammalia



- they **have hair**
- the **mammary glands** (modified sweat glands) of females secrete milk
- give birth to live young
- are **warm-blooded**
- have a **four chambered heart**
- the teeth are usually of four well-defined types: **incisors, canines, premolars & molars**
- examples: cat, bat, whale, humans