

Classification of the Natural World

Grizzly bear Black bear Giant panda Red fox Abert squirrel Coral snake Sea star



KINGDOM Animalia



PHYLUM Chordata



CLASS Mammalia



ORDER Carnivora



FAMILY Ursidae



GENUS Ursus



SPECIES *Ursus arctos*

Classification

- **Taxonomy**- discipline of classifying organisms and assigning each organism a universally accepted name
- **Binomial Nomenclature**- two-word naming system or two part scientific name.
 - Organism's name: Genus and species
 - Example: Humans or Bears

8 levels of taxon







1. Domain > Kingdom > Phylum > Class > Order > Family > Genus > Species
 - a) Mnemonic Device – Can you think of one to help you remember this order.
 - i. Did King Phillip Come Over For Green Soup?
 - b) History of Taxonomy:
 - a) 1700s-Only 2 Kingdoms- Plantae, Animalia
 - b) 1800s- Protista, Plantae, Animalia
 - c) 1950s- Monera, Protista, Fungi, Plantae, Animalia
 - d) 1990s- Eubacteria, Archaeobacteria, Protista, Fungi, Plantae, Animalia.

- The current classification method is called systematics.
- Using systematics, scientists identified two distinct groups in Kingdom Monera – Bacteria and Archaea.
- This led to the development of another level of classification called domains

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- Today- All living organisms divided into 3 Domains:
 - 1) Archaea (like bacteria, no peptidoglycan) includes Kingdom Archaeobacteria
 - 2) Bacteria – includes Kingdom Bacteria
 - 3) Eukarya – includes Kingdoms Protista, Fungi, Plantae, and Animalia

Domains and Kingdoms

Domain	Bacteria	Archaea	Eukarya			
Kingdom	Bacteria	Archaea	Protista	Fungi	Plantae	Animalia
Example						
Characteristics	Bacteria are simple unicellular organisms	Archaea are simple unicellular organisms that often live in extreme environments.	Protists are unicellular and are more complex than bacteria or archaea.	Fungi are unicellular or multicellular and absorb food .	Plants are multicellular and make their own food.	Animals are multicellular and take in their food.

Classification of Humans and Bears

Humans

Domain – Eukarya
Kingdom – Animalia
Phylum – Chordata
Class – Mammalia
Order – Primates
Family – Hominidae
Genus - *Homo*
Species - *sapiens*

Polar Bears

Domain – Eukarya
Kingdom – Animalia
Phylum – Chordata
Class – Mammalia
Order – Carnivora
Family – Ursidae
Genus – *Ursus*
Species - *maritimus*

Animal Kingdom

1. Animals - Animalia

- multicellular,
 - eukaryotic,
 - heterotrophs
 - whose cells lack cell walls!
-
- 95% Invertebrates- no backbone or vertebral column
 - 5% Vertebrates.

- **Essential Functions**

- Feeding- need food, cannot make own energy
- Respiration- take in O_2 , give off CO_2
- Circulation- move materials around body
- Excretion- getting rid of poisons and wastes
- Response- ability to react to environment
- Movement- avoids predators or attack prey
- Reproduction- sexual or asexual.

Animal Evolution

1. Cell Specialization and levels of organization

2. Early development

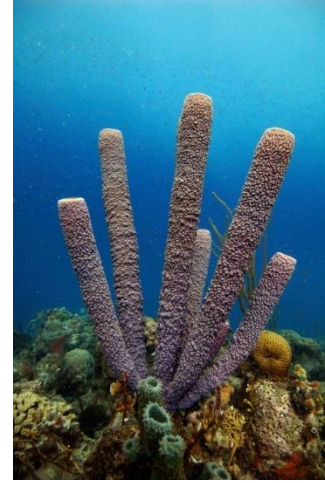
a. zygote-blastula

- i. Protostome- mouth formed from blastopore
- ii. Deuterostome- anus formed from blastopore

3. Body Symmetry

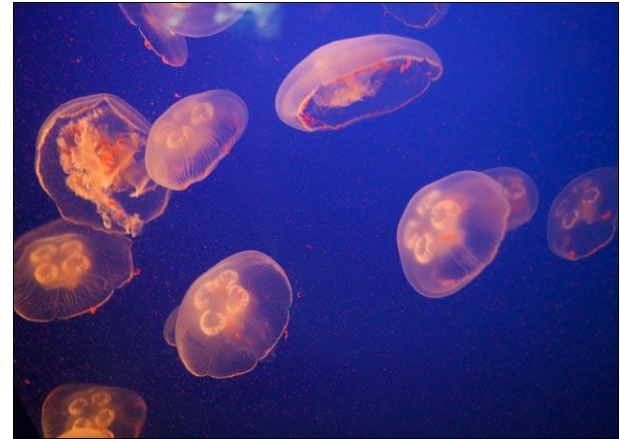
a. Asymmetrical

- i. It is irregular in shape and has no symmetry or balance in its body structures.



b. Radial symmetry

- i. An animal with radial symmetry can be divided along any plane through a central axis, into roughly two equal halves.



b. Bilateral symmetry

- i. An animal can be divided into mirror image halves only along one plane through the central axis

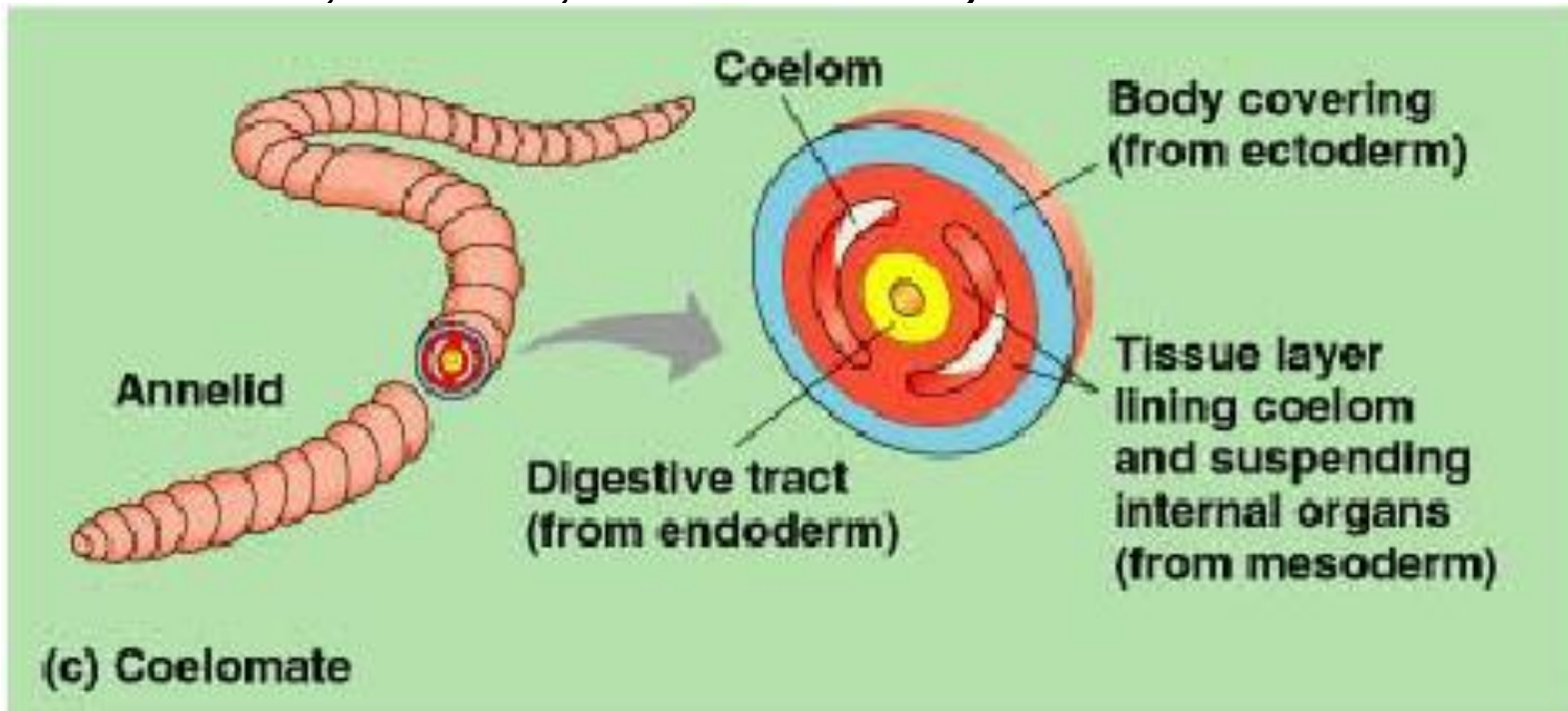


4. Animals with bilateral symmetry also have an anterior, or head end, and a posterior, or tail end.
 - a. Cephalization – The tendency to concentrate nervous tissue and sensory organs at the anterior end of the animal.

5. Body Cavity Formation

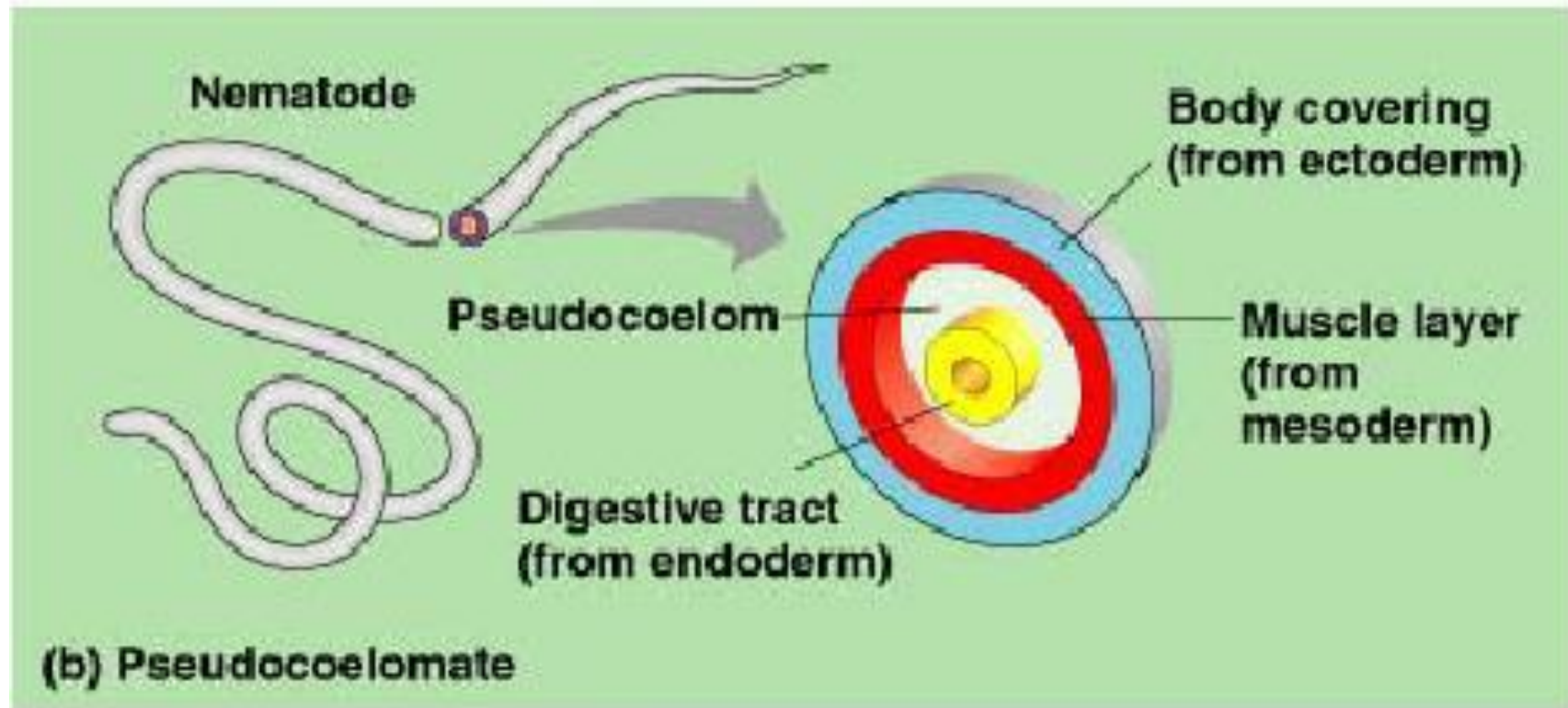
a. Coelomates

- i. Between the gut and the outside body wall of most animals with bilateral symmetry is a fluid filled body cavity
- ii. One type of fluid-filled cavity, the coelom has tissue formed from mesoderm that lines and encloses the organs in the coelom.
- iii. Humans, insects, fish and many other animals



b. Pseudocoelomates

- i. A pseudocoelom is a fluid-filled body cavity that develops between the mesoderm and endoderm rather than developing entirely within the mesoderm
- ii. The body cavity of pseudocoelomates separates mesoderm and endoderm, which limits tissue, organ, and system development.



c. Acoelomates

- i. Such as the flatworm are animals that do not have a coelom
- ii. The body plan of acoelomates is derived from ectoderm, endoderm and mesoderm, just like coelomates
- iii. Acoelomates have solid bodies without a fluid filled body cavity between the gut and the body wall.

