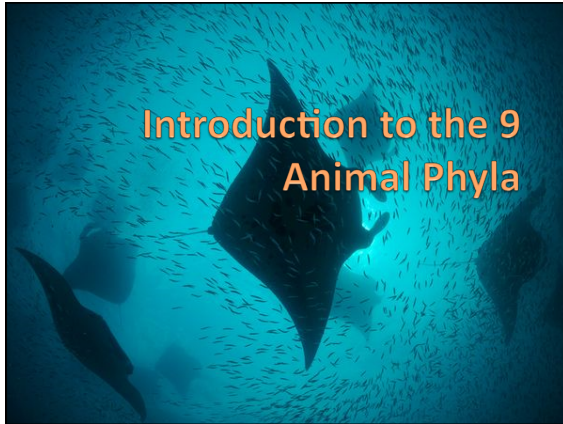




Animal Characteristics & Introduction to Animal Phyla



Characteristic's of Living Things

1. Chemical Uniqueness: Molecular Organization
2. Hierarchical Organization: macromolecules -> Cells ->Organs ->Organ systems ...
3. Reproduction
4. Genetic Programs
5. Metabolism
6. Development
7. Environmental Interaction

What are the five characteristics of the Animal Kingdom?

1. Animals are eukaryotic.
2. Animals cells lack cell walls.
3. Animals are (mostly) multicellular.
4. Animals are heterotrophs that ingest food.

How do they compare to the other kingdoms in the Domain Eukarya?

Characteristic	Protists	Fungi	Plants	Animals
Eukaryotic	All	All	All	All
Lack Cell Walls	Some	Few	None	All
Multicellular	Some	Most	All	All
Heterotrophic	Some	All	Few	All

How are they classified?

- By having a backbone (vertebrate) or not having a backbone (invertebrate).

95% Invertebrates make up of the different animals on Earth!

OCTOPI WALL STREET



Invertebrates are 97% of animal diversity!

What are the phyla of the invertebrates?

Phylum	Example
Porifera	Sponges
Cnidaria	Jellies, Corals, Sea Anemones
Platyhelminthes	Flatworms
Nematoda	Roundworms
Annelida	Segmented Worms
Mollusca	Mollusks (Snails)
Echinodermata	Star Fish
Arthropoda	Insects, Arachnids, Crustaceans

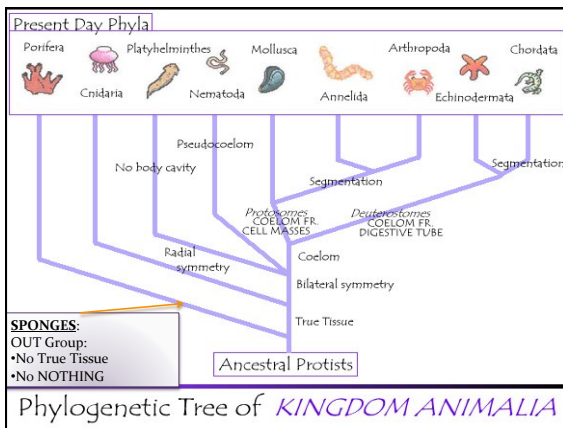
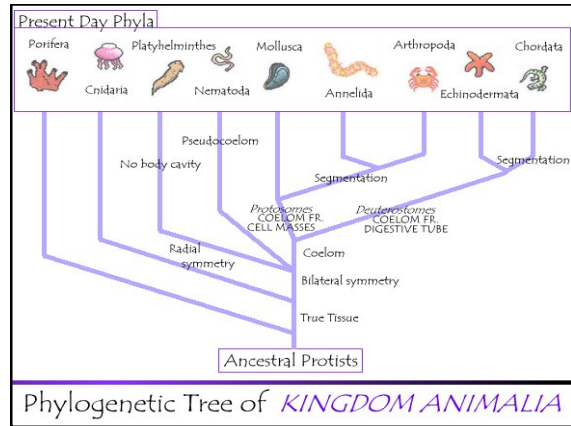
Animal Characteristics & Introduction to Animal Phyla

What is the phylum of vertebrates?

Phylum	Examples
Cordata	Fish, amphibians, birds, reptiles, mammals

Chordate Characteristics:

1. Dorsal Hollow Nerve Cord
2. Notochord
3. Pharyngeal Gill Slits
4. Post Anal Tail



Phylum: Porifera

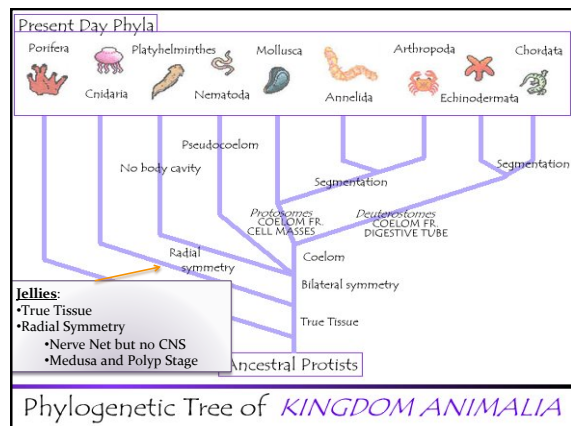
- Symmetry: none
- Method of movement: sessile (anchored in place)
- Diversity: 9000 species that come in different sizes, shapes, and colors
- Other important facts: simplest animals, lack true tissues and organs, have several protist-like features
- Examples: sponges

tube sponges

Phylum: Cnidaria

- Symmetry: radial
- Method of movement: Medusae are slow moving using rhythmic contractions while polyps are sessile.
- Diversity: 9000 species with two body forms (medusa and polyp)
- Other important facts: have tentacles with stinging cells, has a central mouth and digestive sac, have some basic tissues such as epidermis for protection and sensing
- Examples: Portuguese Man of War, hydra, jellyfish, sea anemones, coral

coral

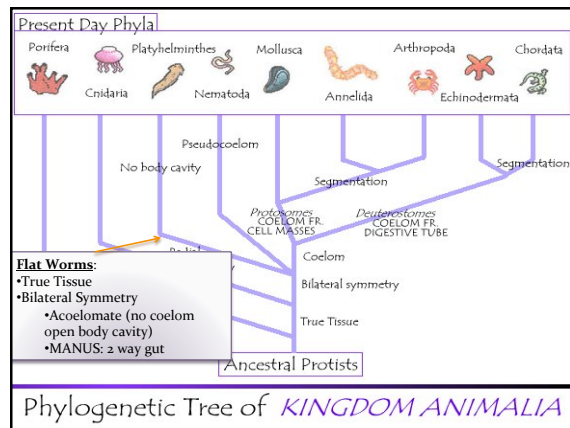


Animal Characteristics & Introduction to Animal Phyla



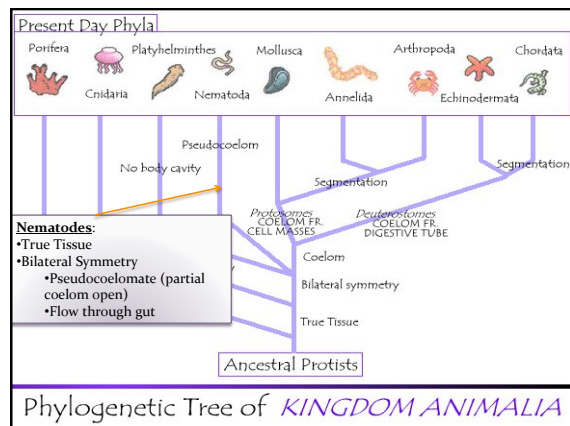
Phylum Platyhelminthes

- Symmetry: bilateral
- Method of movement: muscles allow it to twist and turn and cilia help it
- Diversity: 20,000 species divided into three classes
- Other important facts: simplest animal to have three tissue layers, has eyespots on head to detect light, acoelomates (no body cavity)
- Examples: flatworms, tapeworms, flukes, planarians



Phylum Nematoda and Rotifera


- Symmetry: bilateral
- Method of movement: muscular thrashing
- Diversity: 15,000 Nematode species and 1800 Rotifers species
- Other important facts: 3 tissue layers, complete digestive tract with two openings, pseudocoelom (fluid-filled body cavity)
- Examples: roundworms, flatworms, and segmented worms



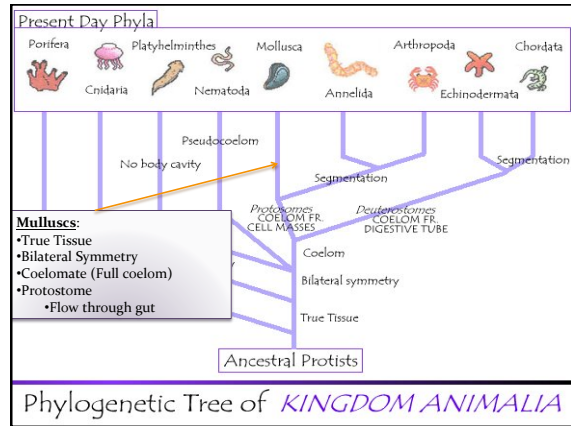
Animal Characteristics & Introduction to Animal Phyla

Phylum: Mollusca

- Diversity: 150,000 species in 3 major classes
- Other important facts: all have a "foot" and a mantle; open circulatory system including a heart; many have shells produced by the mantle; protosome coelomates.
- Examples: squids, octopus, clams, and snails



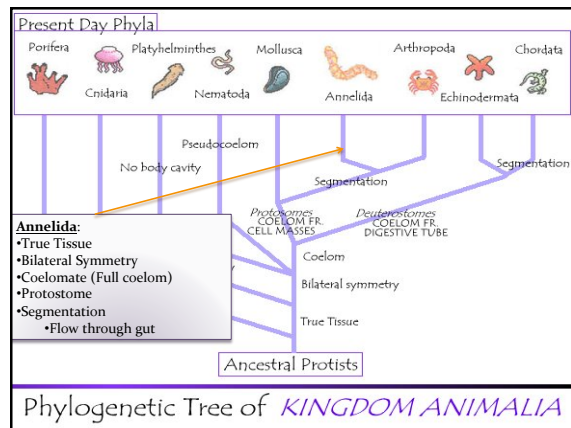


clams




Phylum: Annelida

- Symmetry: bilateral
- Method of Movement: general
- Diversity: 15,000 known with three classes
- Other important facts: has digestive tract, nerve cord and 2 main blood vessels; closed circulatory system; true coelom (fluid cavity lined by tissue)
- Examples: segmented worms, earthworms

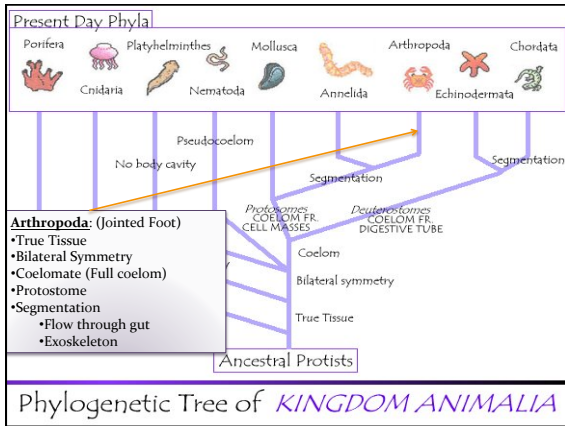

snail



octopus

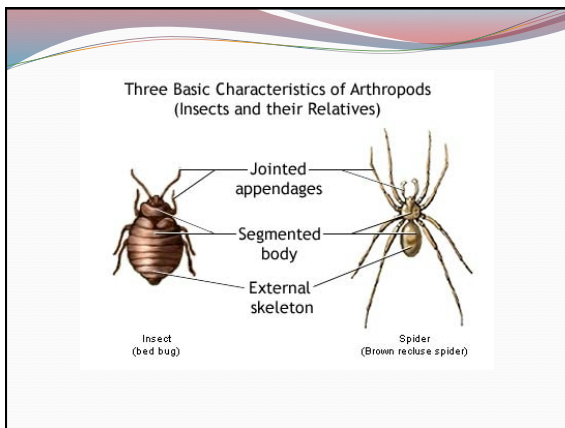
Phylum: Arthropoda

Animal Characteristics & Introduction to Animal Phyla



Class Arachnids

- Environment: mostly live on land
- Diversity: 65,000 species
- Unique Characteristics: two body segments (cephalothorax and abdomen), 4 pairs of jointed appendages, no antennae, fangs
- Examples: scorpions, spiders, ticks, and mites



Class Crustaceans

- Diversity: most common aquatic arthropod.
- Unique Characteristics: 2 body segments; 4 pairs of walking legs and 2 claws; main food source for many fish; watertight exoskeleton.
- Examples: lobsters, crabs, shrimps, crayfish, and barnacles

Animal Characteristics & Introduction to Animal Phyla



Class Insects

- Diversity: more insect species than all other species combined; live mostly on land and in fresh water.
- Other important facts: 3 body segments; 3 pairs of walking legs (jointed appendages); antennae; usually has wings; watertight exoskeleton.
- Examples: beetles, butterflies, ants, mosquitoes, and cicadas




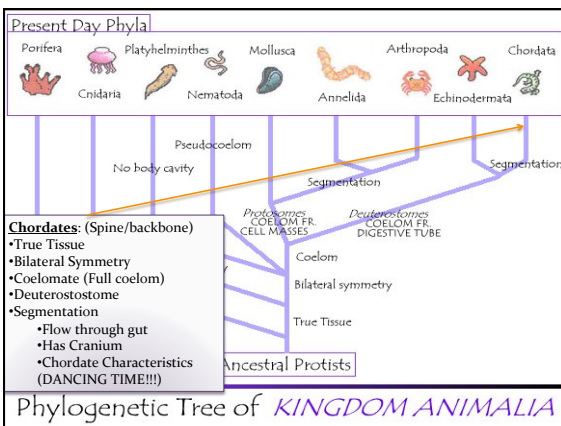
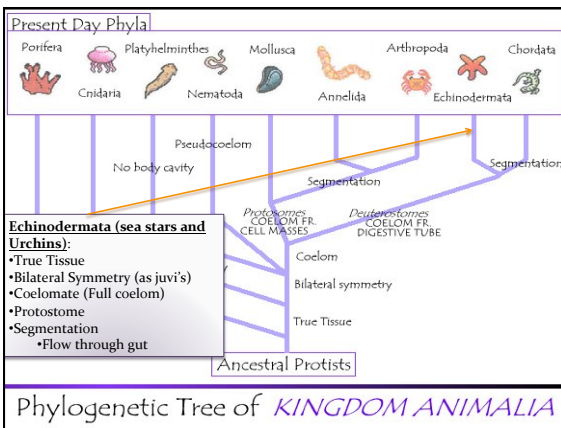
Animal Characteristics & Introduction to Animal Phyla

Phylum Chordata

- Environment:** aquatic and terrestrial
- Diversity:** major classes include amphibians, fishes, reptiles, birds, and mammals
- Unique characteristics:**
 - *Notochord: flexible rod that extends through much of the length of the body ex. Cartilage discs in backbone.
 - *Hollow nerve cord: develops into the brain and the spinal cord.
 - *Pharyngeal slits: slits behind the pharynx connect esophagus and mouth.
 - *Tail: tail occurs some stage of development; many contain backbone segments and muscles

Phylum: Echinodermata

- Symmetry: radial
- Diversity: 7,000 classified into 6 classes
- Other important facts: most have a rough and spiny surfaces; hard internal skeleton, endoskeleton; unique water vascular system; larva show bilateral symmetry and adults have mostly radial symmetry; deuterostome coelomates
- Examples: sea stars, sea cucumbers, sea urchins

Class Fish

- Environment:** aquatic
- Diversity:** makes up 30,000 of the more than 55,000 species of vertebrates; first jawed vertebrates.
- There are **two main groups** of fishes.
 - Cartilaginous fish:** has a flexible skeleton made entirely of cartilage. Includes sharks and rays.
 - Bony fish:** has a skeleton containing bone hardened by calcium compounds. Includes carp, trout, bass, perch, and tuna.

Animal Characteristics & Introduction to Animal Phyla



Class Amphibians

- **Environment:** while spending much of their adult life on land, most return to water to reproduce.
- **Diversity:** 4,200 known species; first vertebrates with adaptations for living on land; earliest tetrapods
- **Unique characteristics:**
 - *Most exhibit a mixture of aquatic and terrestrial adaptations.
 - *Adults generally utilize lungs to breathe air; have a smooth, moist skin; and lack scales.
- **Examples:** frogs, toads, salamanders, and newts

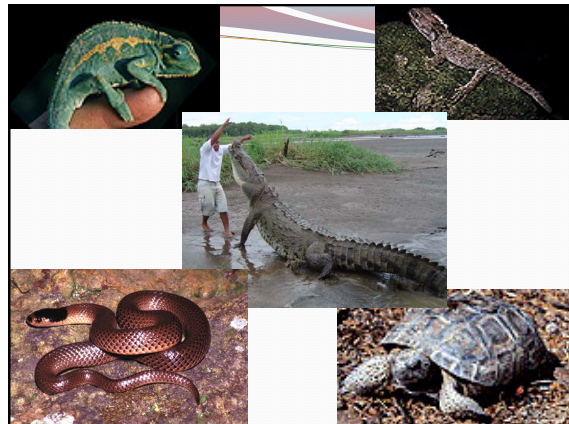


Amniotes

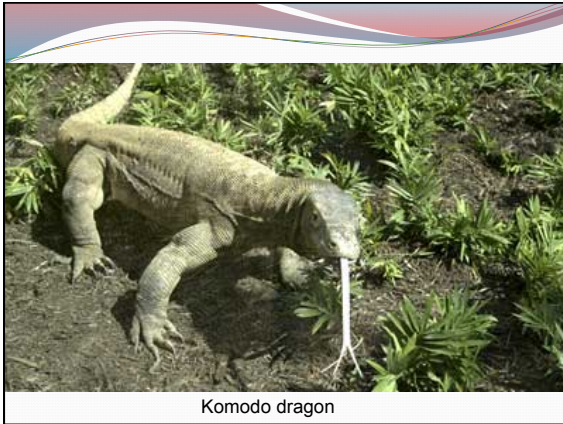
- **Reptiles, birds, and mammals** together make up a vertebrate branch called the amniotes.
- **Three key adaptations** for life on land distinguish amniotes from most amphibians and fishes:
 - Amniotic egg: waterproof egg with a shell
 - Internal fertilization: male deposits sperm in female.
 - Water-tight skin: reptiles have scales, birds have feathers, and mammals have hair, nails, and horns made of keratin.

Class Reptiles

- **Environment:** terrestrial and aquatic
- **Diversity:** 6,500 species
- **Unique characteristics:** scaly skin; ectotherms - obtain heat from the environment; most reptiles lay eggs, although a few species give birth to live young
- **Examples:** turtles, lizards, snakes, crocodiles, and alligators



Animal Characteristics & Introduction to Animal Phyla



Komodo dragon

Class Aves (birds)

- **Environment:** aquatic and terrestrial
- **Diversity:** 9,000 species
- **Unique characteristics:**
 - *Endotherms
 - *Specialized wing shape that produces lift for flight
 - *Feathers: used for flight and endothermy
 - *Numerous weight-reducing features



Class Mammals

- **Environment:** aquatic and terrestrial
- **Diversity:** 4,500 species
- **Unique characteristics:**
 - *Endothermic vertebrates
 - *Adult females produce milk in mammary glands and offspring feed on the milk.
 - *Hair or fur (a dense combination of long and short hairs)
 - *Internally, all have lungs, even aquatic mammals such as whales and dolphins.
 - *Most mammals give birth to young (one group lays eggs).

