



# Kingdom Animalia

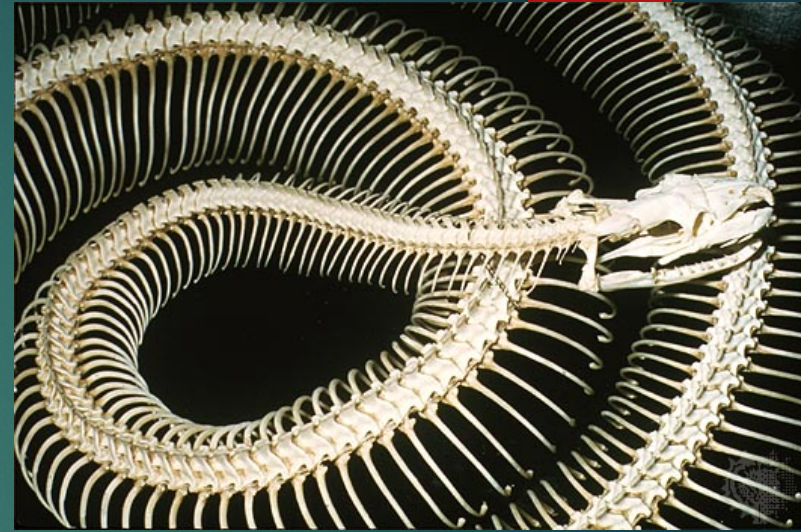
PHYLUM CHORDATA

# General Characteristics

- ▶ To be a chordate, an organism must, for at least some stage of its life, have:
  - ▶ A dorsal, hollow nerve cord
  - ▶ A notochord (a long supporting rod that runs through the body just below the nerve cord)
  - ▶ Pharyngeal pouches (paired, pouch-like structures in the throat region)
  - ▶ A tail that extends beyond the anus

# Chordate vs. Vertebrate

- ▶ Most chordates are vertebrates (have backbones). Two groups do not: the tunicates and the lancelets.
- ▶ A backbone is made of individual segments called vertebrae.
- ▶ Functions of a vertebral column:
  - ▶ Enclose and protect the spinal cord
  - ▶ As part of the endoskeleton it provides support and protection as well as a location for muscle attachment



# Classification & Examples: Non-vertebrate Chordates

- ▶ There are two groups of chordates which do not have backbones:
  - ▶ **Tunicates:** filter feeders known as “sea squirts”
    - ▶ [Tunicate animation](#)
  - ▶ **Lancelets:** a small fish-like organism with no fins
    - ▶ See hand sample



# Body functions: Fishes

- ▶ **Feeding:** every mode of feeding; one-way digestive tract
- ▶ **Respiration:** almost all utilize gills
- ▶ **Circulation:** closed circulatory systems with one heart (one exception) – heart contains one atrium and one ventricle
- ▶ **Excretion:** kidneys filter blood to produce ammonia while other wastes escape through the gills

# Body Functions: Fishes

- ▶ **Response:** well developed brain which coordinates a variety of sensory organs – chemical senses and colour vision are the most developed senses
- ▶ **Movement:** fins propel and steer fish through the water
- ▶ **Reproduction:** internal or external fertilization
  - ▶ *Oviparous:* eggs hatch outside mother's body
  - ▶ *Ovoviviparous:* eggs hatch within the mother and are then born "live"
  - ▶ *Viviparous:* do not develop in eggs at all – born "live"

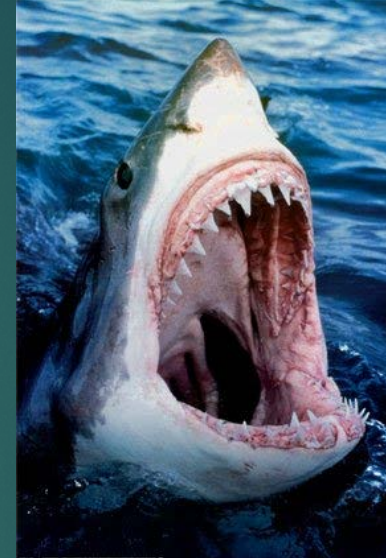
# Class Agnatha



- The “Jawless Fishes”
- Includes the Hagfish (left) and the lamprey (right).
- The Hagfish will produce copious amounts of disgusting slime when disturbed.
- Lamprey attach to host species of fish by a sucking (oral) disk. Sea lampreys suck the body fluids out of host species by using teeth and a grasping tongue that often leave hosts

# Class Chondrichthyes

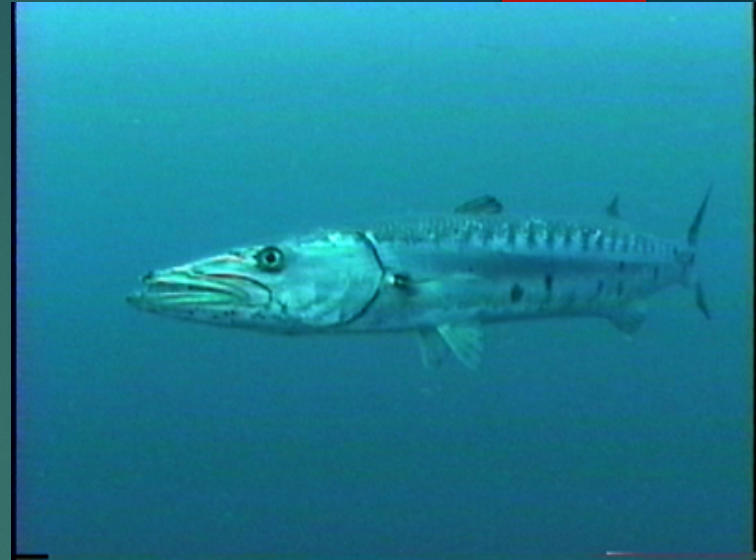
- ▶ Includes sharks, rays, and skates
- ▶ Skeletons made up of cartilage
- ▶ Most are covered in rough scales
- ▶ Most sharks have numerous rows of teeth and replace their teeth as they wear out
- ▶ More than one gill slit – not muscular so sharks must keep moving to respire.
- ▶ E.g. Great White Shark and Stingray



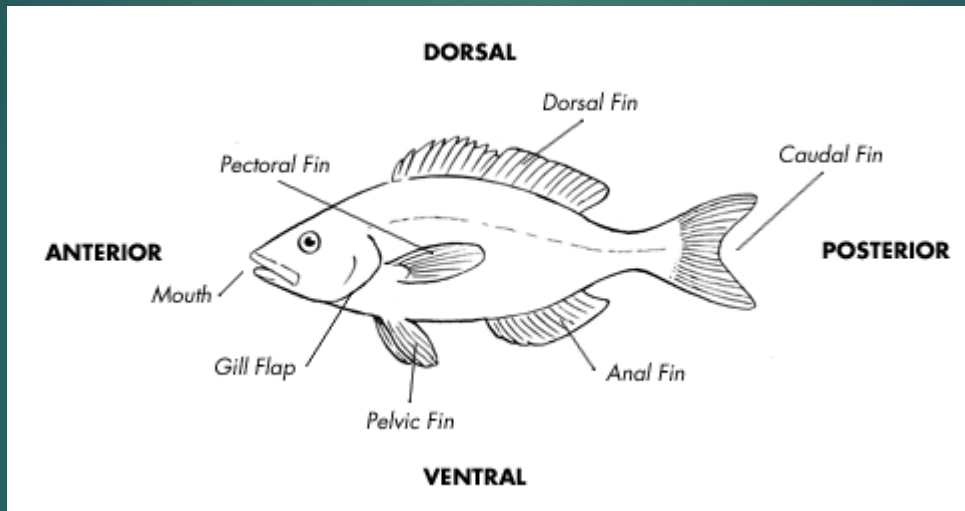


# Class Osteichthyes

- ▶ Bony skeleton
- ▶ Single gill slit – muscular covering which can “pump” water over the gills
- ▶ Most belong to the “ray-finned” fishes which have thin fins. Seven species belong to the “lobe-finned” fishes which have thicker, bone-supported fins.
- ▶ E.g. Great barracuda & angler fish



# Bony fish body plan

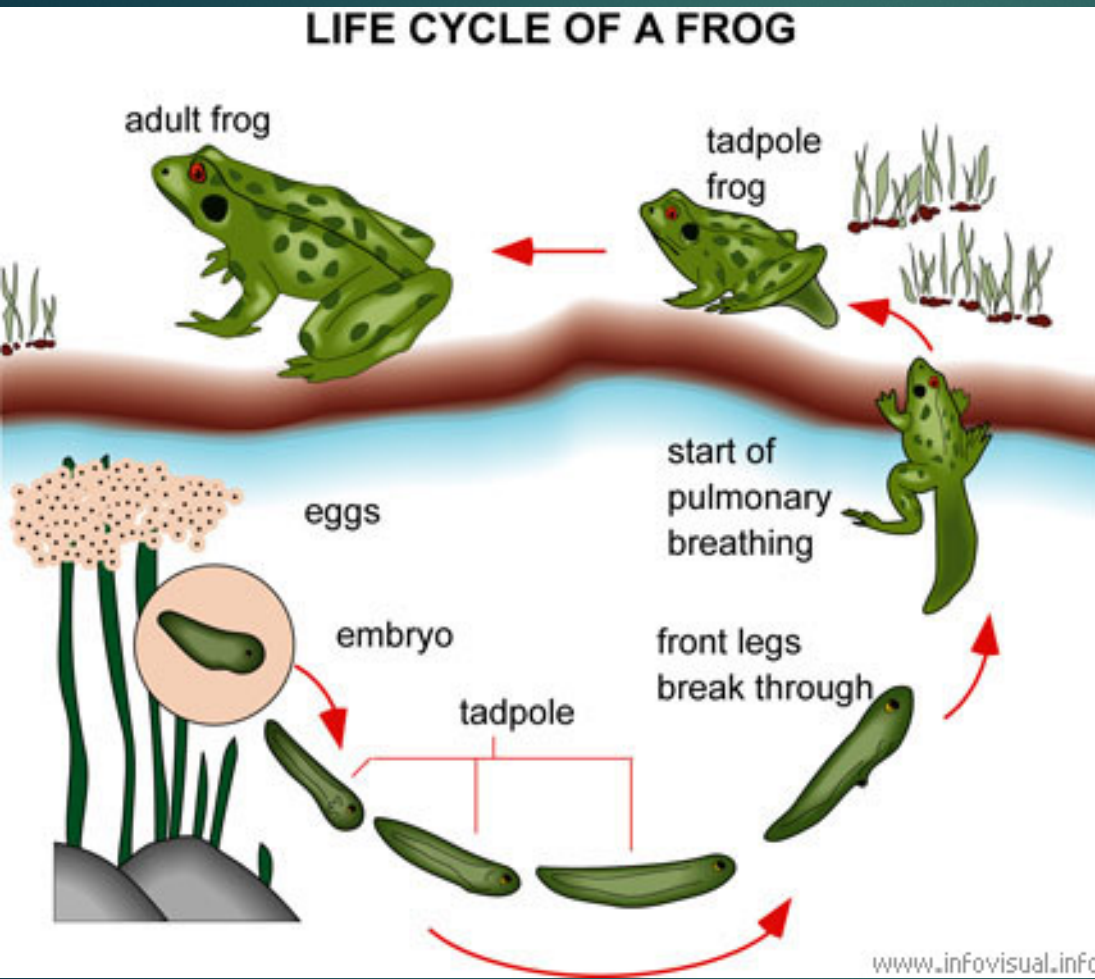


# Class Amphibia

- ▶ Salamanders, newts, frogs and toads are examples of amphibians.
- ▶ Bones in limbs and limb girdles stronger than those in fish to allow terrestrial movement
- ▶ Heart has two atria and one ventricle – an advancement from fish.
- ▶ Eggs are not protected by a shell, so they must be laid in water or they will dry out, killing the embryo.
- ▶ E.g. red eyed tree frog and Giant Pacific Salamander

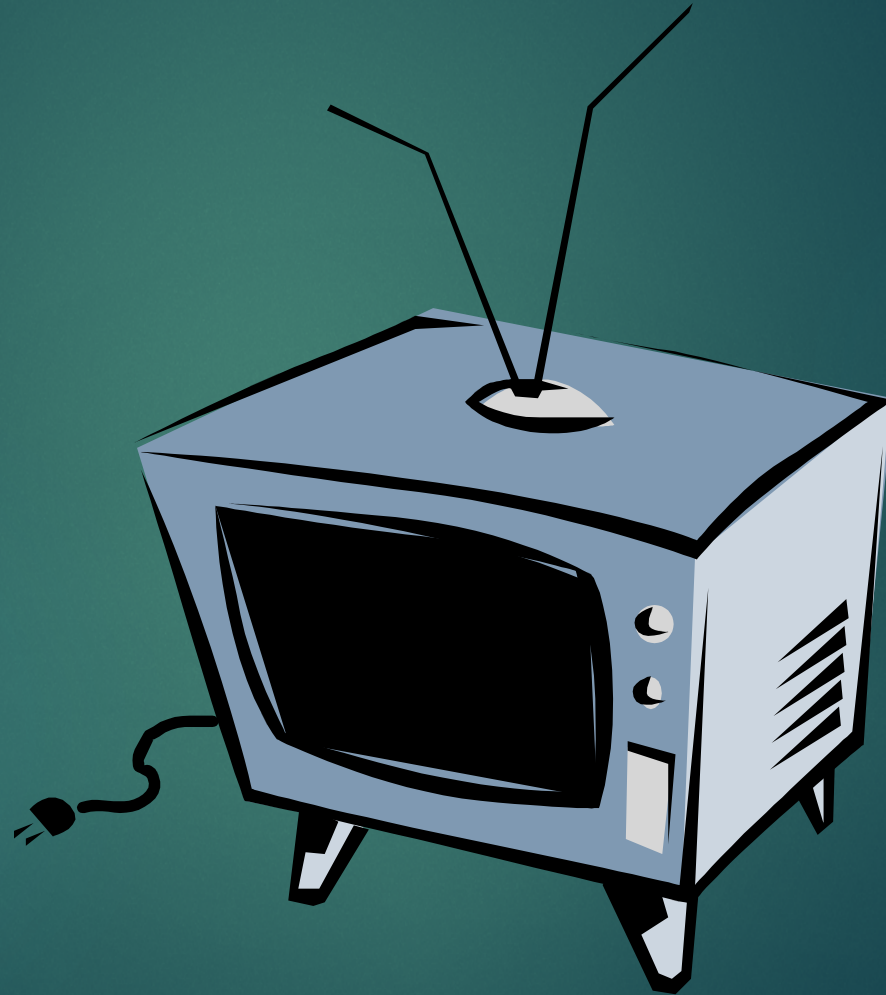


# The Double Lives of Amphibians



- ▶ Amphibian eggs **must** be laid in water to avoid drying out.
- ▶ Larval amphibians (e.g. a tadpole) must live in the water and respire using gills.
- ▶ Amphibians go through a metamorphosis into the adult form and begin to breathe air using lungs.
- ▶ Adult amphibians are terrestrial. The skin also plays an important role in respiration and must remain moist.

# Fish and Amphibia Video



# Class Reptilia



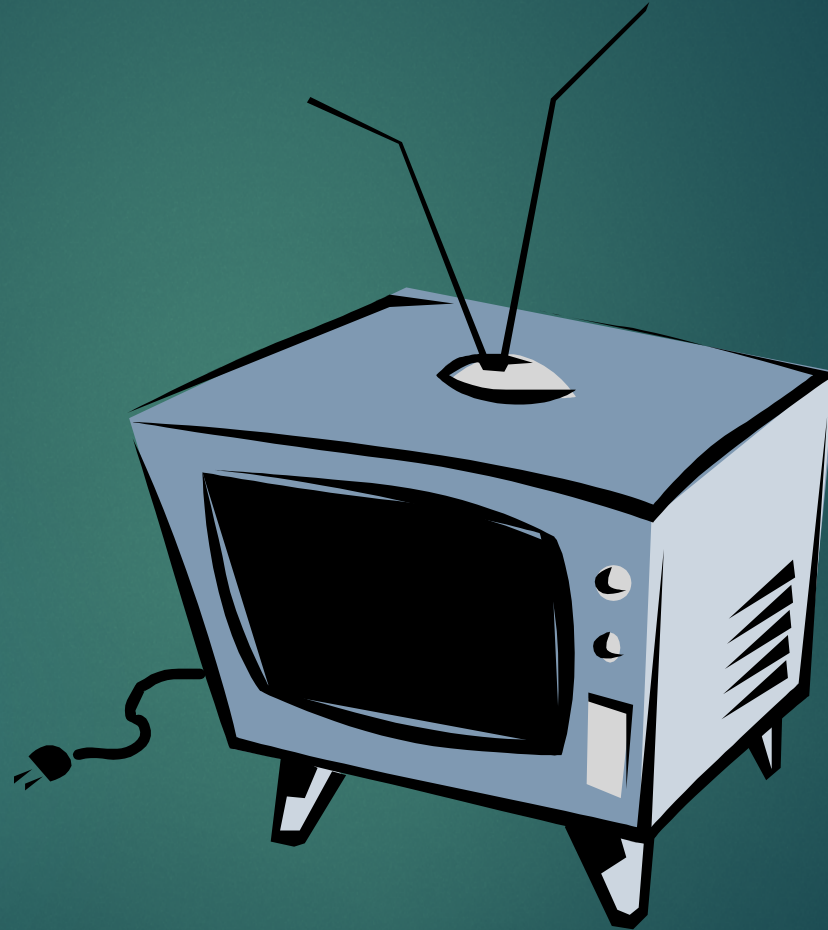
- ▶ Includes:
  - ▶ lizards & snakes
  - ▶ crocodilians
  - ▶ turtles & tortoises
  - ▶ tuataras (resemble lizards)
- ▶ Well-developed lungs and "3 ½" chambered heart
- ▶ Strong limbs
- ▶ Water-conserving excretory system
- ▶ Ectothermic – "cold blooded"
- ▶ Internal fertilization
- ▶ Lay **amniotic eggs** in shells so they are not tied to water for reproduction
- ▶ B.C. species include Western Yellow-bellied Racer and Western Painted Turtle

# Class Aves

- ▶ Outer covering of feathers
- ▶ Two legs covered in scales for walking or perching; Two limbs covered in feathers modified into wings.
  - most species can fly
- ▶ One way flow of air through the respiratory system via **air sacs** and then the lungs – allows higher metabolic rate
- ▶ Four chambered heart – “double loop” circulation.
- ▶ Endothermic – “warm blooded”
- ▶ Internal fertilization
- ▶ Lay **amniotic eggs** in shells
- ▶ B.C. species include the Bald Eagle and Great Blue Heron



# Reptile and Bird Video



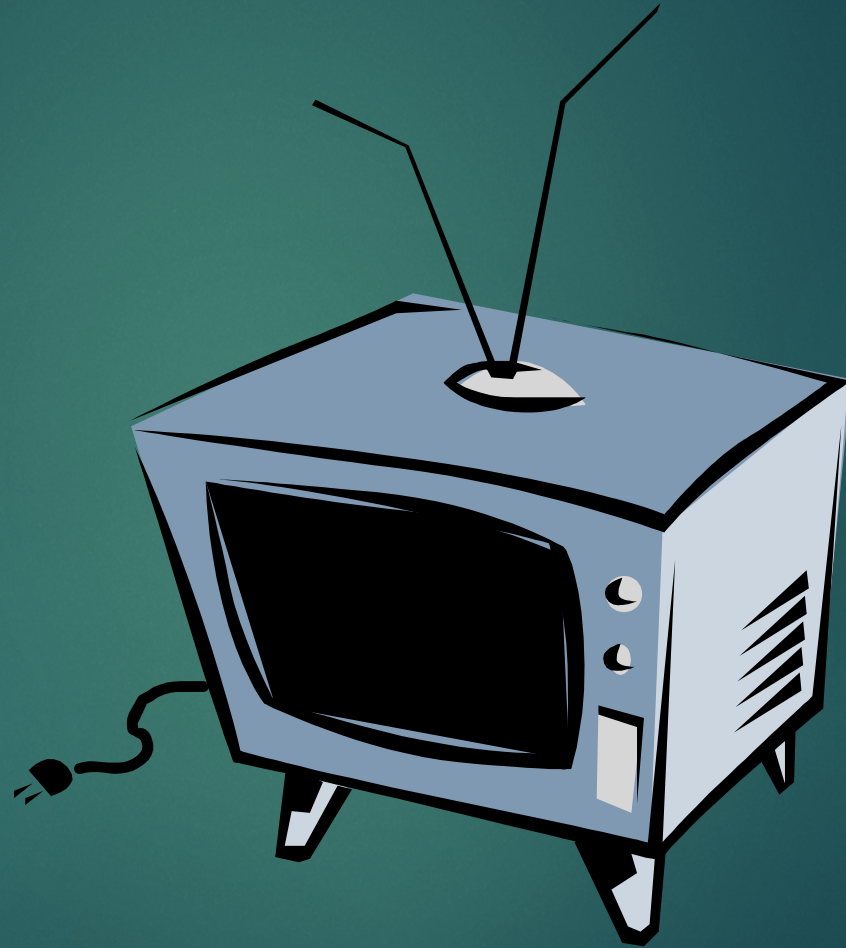


# Class Mammalia

- ▶ Groups:
  - ▶ **Monotremes** – lay eggs
  - ▶ **Marsupials** – most development occurs in pouches
  - ▶ **Placental Mammals** – development occurs inside the mother
- ▶ Bodies covered in hair
- ▶ Produce milk in **mammary glands**
- ▶ Breathe air and have a four chambered heart
- ▶ Well developed cerebral cortex for higher level thinking
- ▶ Endothermic (warm-blooded) and have subcutaneous fat
- ▶ Teeth are well adapted to the type of food consumed
















# Mammal Video



# Orders of Placental Mammals

- ▶ For interest sake, take a look at pages 830 – 831 in the text to see the various orders of placental mammals. Pretty cool!
- ▶ I have divided the picture onto the next 2 slides.

Order	Typical Examples	Key Characteristics	Approximate Number of Living Species
Rodentia	Beavers, mice, porcupines, rats 	<i>Small plant eaters</i> Chisel-like incisor teeth	1,814
Chiroptera	Bats 	<i>Flying mammals</i> Primarily fruit or insect eaters; elongated fingers; thin wing membrane; nocturnal; navigate by sonar	986
Insectivora	Moles, shrews 	<i>Small, burrowing mammals</i> Insect eaters; most primitive placental mammals; spend most of their time underground	390
Marsupialia	Kangaroos, koalas 	<i>Pouched mammals</i> Young develop in abdominal pouch	280
Carnivora	Bears, cats, raccoons, weasels, dogs 	<i>Carnivorous predators</i> Teeth adapted for shearing flesh; no native families in Australia	240
Primates	Apes, humans, lemurs, monkeys 	<i>Tree-dwellers</i> Large brain size; binocular vision; opposable thumb; end product of a line that branched off early from other mammals	233
Artiodactyla	Cattle, deer, giraffes, pigs 	<i>Hoofed mammals</i> With two or four toes; mostly herbivores	211

Cetacea	Dolphins, porpoises, whales		<i>Fully marine mammals</i> Streamlined bodies; front limbs modified into flippers; no hind limbs; blowholes on top of head; no hair except on muzzle	79
Lagomorpha	Rabbits, hares, pikas		<i>Rodent-like jumpers</i> Four upper incisors (rather than the two seen in rodents); hindlegs often longer than forelegs, an adaptation for jumping	69
Suborder Pinnipedia	Sea lions, seals, walrus		<i>Marine carnivores</i> Feed mainly on fish; limbs modified for swimming	34
Edentata	Anteaters, armadillos, sloths		<i>Toothless insect eaters</i> Many are toothless, but some have degenerate, peglike teeth	30
Perissodactyla	Horses, rhinoceroses, zebras		<i>Hoofed mammals with one or three toes</i> Herbivorous teeth adapted for chewing	17
Proboscidea	Elephants		<i>Long-trunked herbivores</i> Two upper incisors elongated as tusks; largest living land animal	2