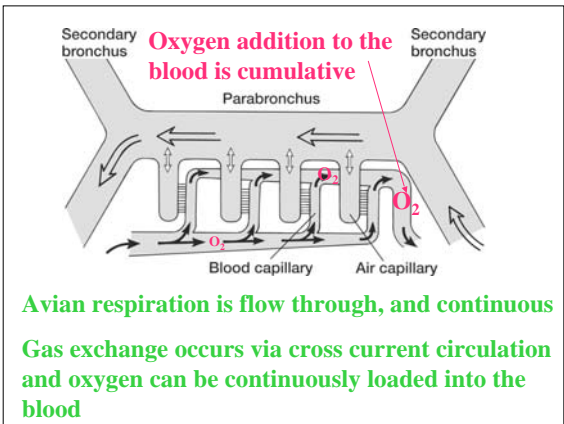
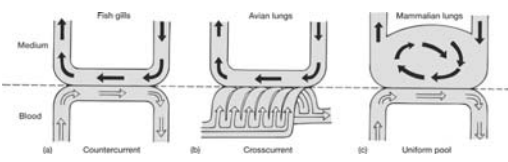


- A complete respiratory cycle in a bird requires two inhalations and two exhalations
- Air entering (inhalation I) goes to posterior air sacs first, and some to parabronchi of lungs
- At exhalation I air from lungs is expelled and air from posterior air sacs replaces it
- At inhalation II enters posterior air sacs and some goes to lungs as occurred in Inhalation I
- Air from Inhalation I then goes to anterior air sacs
- Exhalation II pushes spent air from lungs and anterior air sacs out

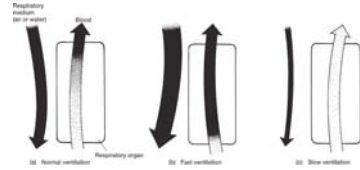




Patterns of gas transfer

(a) Counter current (b) crosscurrent and (c) uniform pool

Different mechanisms occur in different organisms and this works for heat exchange



(a) In correct blood flow and air or water flow rates (perfusion), blood is saturated with oxygen as it is ready to leave respiratory organ.

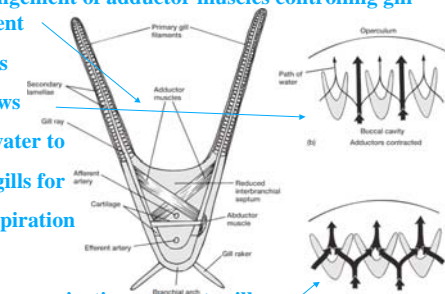
(b) Too fast ventilation blood takes up oxygen but still is in respiratory organ for longer time before departing

(c) If ventilation is too slow blood leaves respiratory organ prior to saturation

(a) Arrangement of adductor muscles controlling gill filament positions

(b) Allows excess water to bypass gills for slow respiration

(c) Higher respiration rate puts gills more directly into water path



Elimination

Out of blood

Build up

CO₂ + H₂O ⇌ H₂CO₃ ⇌ H⁺ + HCO₃⁻

Carbon dioxide Water Carbonic acid Hydrogen ion Bicarbonate

Into blood (pH)

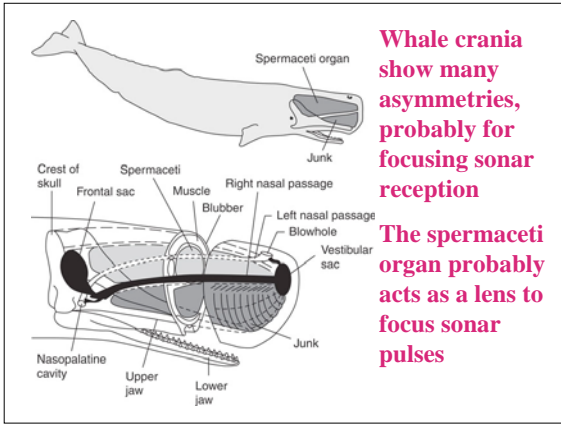
Oxygen and carbon dioxide balance in the blood affects the pH, or the acid-base balance

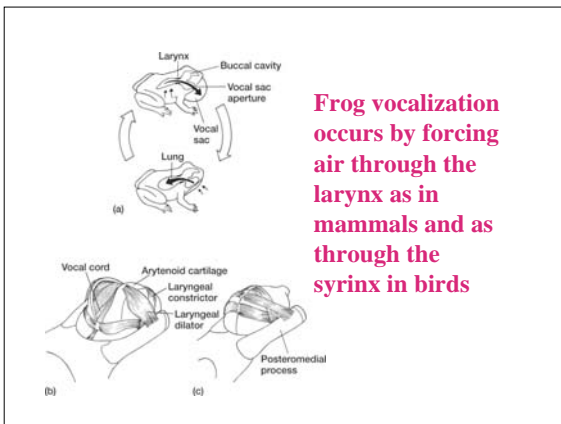
Maintenance of the correct pH is essential for metabolic functions to occur normally and respiratory mechanisms assist in keeping this balance correct

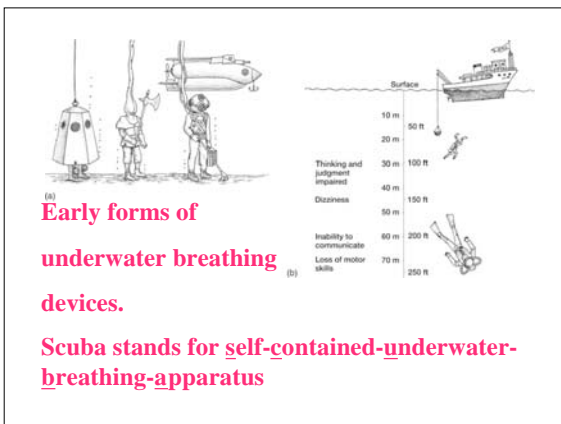
Summary of organisms and different breathing systems. Be sure you understand which animals have which systems and how each works

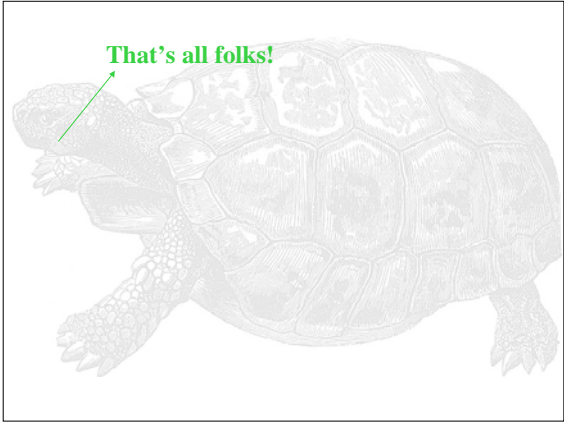
Gill ventilation inflow in sturgeons varies when the mouth is blocked by bottom feeding.

Water enters through the dorsal opercular canal similar to a spiracle









That's all folks!
