

Define the following terms:

Dalton's law

Hematocrit

Carbonic anhydrase

Hemerythrin

Myoglobin

Surfactants

Gas gland

2,3 Diphosphoglycerate (DPG)

Physoclistic

Ram ventilation

Plethodontidae

Fill in the blank

At 800 torr and 25% O₂, what is P_{O₂} _____?

The % saturation of blood is defined as the concentration of _____ divided by the combined concentration of _____ and _____.

A _____ involves shifting of the oxygen disassociation curve to the right while _____ involves a shift downward.

The _____ in fishes is a measure of the proportion of ventilated water that actually comes into contact with gill tissue. The structures in fish gills that actually do the gas exchange are called _____.

Lungs that are difficult to expand (small increase in volume for a large change in pressure differential) are said to have low _____.

Fishes that can switch from primary use of gills to primary use of lungs are called _____ air breathers, while those that can only use lungs are called _____ air breathers.

As respiratory structures, only _____ provide a true countercurrent exchange with the respiratory medium. The next most efficient system is the crosscurrent exchange seen in _____.

Air or swim bladders evolved as structures to utilize atmospheric air for oxygen. In modern fishes, air bladders also serve functions as _____ and _____.

Total oxygen capacity of blood is a function of _____, _____, and _____.

Describe the differences in atmospheric concentration, diffusion rate and solubility of O₂ and CO₂. What are the physiological and ecological implications of these differences.

What type of fish would you expect to have the greatest gill surface area (corrected for body size) and why? For what type of fish would you expect to have hemoglobin with the lowest oxygen affinity and why?

Describe the advantages and disadvantages of using air vs. water as a respiratory medium. A number of animals use both, what are the advantages and potential disadvantages of being able to switch?

What is the Henderson-Hasselbalch equation and why is it important in the physiology of gas exchange?

Discuss the short term (acclimatory) and long term (evolutionary) changes you would expect to see in blood physiology of a mammal species living at high altitude.

When viewing the oxygen disassociation curves, what types of animals (answer in terms of activity, basal metabolic rate, and type of environment occupied) would you expect to be shifted to the right vs. shifted to the left? Explain why this pattern is advantageous for these animals in these environments (ie. why is the curve shifted the way it is).

Explain (including a diagram) how physoclistic fishes inflate their air bladders.
