

Round: 11B

1. Describe the process of inflation in each type of swim bladder.

a) Physostomous / Open swim bladder:

The swim bladder is capable of receiving or adding gas from (to) the gut (2 pts) because of the presence of a pneumatic duct/connection between the gut and swim bladder (2 pts).

Also accept: Fish can fill up the swim bladder by gulping air at the water surface (2pts)

b) Physoclistous / Closed swim bladder:

The swim bladder has to receive or add gas from (to) the blood (2 pts) because the pneumatic duct/connection between the gut and swim bladder is absent / special tissues and glands are present to regulate the bladder (2 pts)

Also accept: The swim bladder is closed off from the mouth (2 pts).

2. If a fish descends the water column and wants to maintain a lower position, but doesn't want to be on the bottom, would the fish have to expel or take in air? Describe how this action would work.

The bladder would have to take in some volume of air (2 pts), as increasing depth would increase pressure (2 pts) and reduce the initial volume of air (2 pts). Descending without taking on air would result in a sinking-effect until the bottom stopped the descent (2 pts).

3. Not all fish regulate buoyancy through a gas bladder. Name two (2) other adaptations a fish might have to deal with maintaining position in the water column.

Incorporation of substances that are less dense than water (2 pts), such as fats and oils. When in motion, certain fins create lift (2 pts)—much like wings of an airplane—and can help reduce sinking and even propel a fish upward.